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Helle Wins



How close can an election be, if it isn't a tie? That question was answered with the announcement by Secretary Roy Nakatani that the election for AIFRB President-Elect was won by Dr. Jack Helle by a 1-vote margin.

Dr. Nakatani says, "The winner is Dr. Jack H. Helle, National Marine Fisheries Service at Auke Bay, Alaska. The race could not have been closer without ending in a tie. We had two outstanding candidates in Dr. Helle and Dr. Clark Hubbs. Congratulations to Dr. Helle, our President-Elect, and to Dr. Hubbs for being such a competitive runner-up."

Jack Helle will serve as AIFRB President for the 1990-1992 term.

Because the race was so close, Roy Nakatani was extra careful; he asked Nancy Drummond Davis (FRI biologist), Robert F. Donnelly (FRI biologist and lecturer), and Robert L. Burgner (professor emeritus) to recount the ballots independently. They all verified that Jack was the winner.

A summary of the count shows that 727 ballots were mailed and 404 were returned, including ballots not marked, envelopes without ballots, late ballots, and ballots returned because of wrong address. Those not returned numbered 323. Dr. Helle received 200 votes; Dr. Hubbs received 199 votes.

We all join Dr. Nakatani in congratulating both candidates, and we look forward to following Jack Helle's lead when he assumes the AIFRB presidency at the 1990 Board of Control meeting.

Rachlin Thanks

Dr. Joseph Rachlin, AIFRB Treasurer, wishes to thank all the Emeritus members who made voluntary contributions to the AIFRB treasury in 1989. These additions to our balance will help advance the many projects and programs in which we are involved.

AIFRB Symposium Volume

AIFRB sponsored a symposium, *Writing for Fishery Journals*, at the annual meeting of the American Fisheries Society in Toronto in 1988. AIFRB Past-President John Hunter, organizer of the symposium, announces that the symposium volume will be published by the American Fisheries Society in April 1990. The volume will be of general use as an aid to fishery biologists preparing manuscripts for publication. Topics and authors are as follows: "Statistical problems in fisheries" by Douglas G. Chapman; "Problems with gray literature in fishery science" by Bruce B. Collette; "We don't care, Professor Einstein, we specifically said *double-spaced*" by Andrew E. Dizon; "Usage and style in fishery manuscripts" by Paul H. Eschmeyer; "Graphic and tabular display of fisheries data" by Victor S. Kennedy; "Scientific writing as English prose" by Carl J. Sindermann; and "Common statistical errors in fishery research" by Edward A. Trippel and John J. Hubert.

Fish Fauna Decline

The American Fisheries Society has issued a report on the status of North American fish fauna. The report details the continuing decline of the health of our continent's rivers, lakes, and spring systems.

The study documents that, in the United States alone, 62 fishes qualify for endangered status and another 84 are threatened. In the U.S., Canada, and Mexico the number of fishes warranting special protection because of their rarity rose from 251 in 1979 to 364 in 1989. This represents an increase of 45% in the number of rare fishes during the past decade.

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Fish Fauna cont.

The increasing threat to our fishes and aquatic habitats is most notable in the West and Southwest, where competition for water is fierce. California and Nevada have the worst records, with more than 40 rare fishes documented from each state.

Even more seriously, 40 fishes from North America have become extinct as a result of expanding human pressures on our aquatic resources. Extinct fishes include the blue pike from the Great Lakes (killed off by pollution and overfishing), the Raycraft Ranch poolfish from Nevada (extirpated when its only remaining habitat was bulldozed and covered over for agricultural expansion), the Alvord cutthroat trout from streams in Oregon and Nevada (lost because of hybridization with stocked trout from hatcheries), the Snake River sucker from Wyoming (lost because of dams and water diversions on the Snake River), and the Monkey Spring pupfish from Arizona (lost from a combination of wetland draining and the introduction of non-native predators into its remaining habitat).

Despite a strong Endangered Species Act, agencies were not able to keep pace with the growing list of endangered and threatened fishes. The report found that during the past decade, for every fish whose status improved, 25 fishes declined significantly in range and number. "The extent of the problem and our lack of success during the past 10 years in dealing with the growing list of threatened and endangered fishes clearly indicates that our present conservation efforts are not getting the job done," said Jack Williams, chairman of the American Fisheries Society's Endangered Species Committee and chief author of the report.

Carl Sullivan, executive director of AFS, stated that "we need an increased commitment from the political leaders of our country, more funding for recovery and habitat protection programs, and a new strategy for protection of overall biodiversity, including protection of communities and ecosystems before their species reach the critical endangered stage."

The report concludes with the recommendation that government agencies manage for conservation of entire ecosystems rather than the recovery of individual species. "If we keep waiting until species become endangered before trying to protect their habitat, we will see more and more species lost forever," Sullivan remarked.

The report is available from Beth McAleer, American Fisheries Society, 5410 Grosvenor Lake, Suite 110, Bethesda, MD 20814-2199.

Costs of "Invaders"

Cost estimates for the Great Lakes invasion of the zebra mussel have climbed into the billions of dollars, and researchers are scrambling to determine the threat posed by the river ruffe (*Acerina cernua*). Pressure is growing, meanwhile, for a permanent requirement for ships entering the St. Lawrence Seaway to exchange their ballast, to protect the Lakes from more "invasions."

The zebra mussel, no larger than a pinto bean, has spread rapidly throughout Lake Erie and Lake St. Clair since it was first discovered in 1986. The mussel, which appears to have no natural predators in the Lakes system, attaches itself to intake pipes for municipalities, power plants, and industrial water users. Municipal drinking-water plants are reporting flow reductions as high as 55%.

Noting a Cleveland official's estimate that the city will have to spend \$50 million to clear and enlarge intake pipes, Jon Stanley of the U.S. National Fisheries Research Center said, "Most intakes on the Lakes are not designed for this. Users may have to lay a lot of new pipes."

Stanley said his "wild guesses" of the costs to cities, power plants and industry over the next decade come to more than \$4 billion (U.S.). Chlorinating the pipes would be cheaper, but "that would cause a lot of environmental damage, and it's not a socially acceptable solution anymore."

Shippers and boaters are incurring extra expenses to have the mussels scraped off their vessels' hulls, Stanley noted.

Scientists studying the zebra mussel have also issued warnings that the small mollusc's impact on Great Lakes fisheries "could be fantastic," as Environment Ontario researcher Rick Turnbull put it.

Paul Hebert, director of the University of Windsor's Great Lakes Institute, said, "It's not clear right now, but they could be having a major effect on the food chain."

Zebra mussels are "filter feeders," who pull water through their shells to siphon off zooplankton and other macro-organisms. "Given the 'phenomenal' population growth of the mussels in warm, shallow lakes like St. Clair and Erie," Herbert said, "mussels may be greatly reducing the food available to juvenile fish."

"Water in Lake St. Clair is reaching clarity levels that haven't been seen in years," Herbert said. "We haven't been able to find much zooplankton at all."

Stanley estimated that the mussels could reduce the Lake Erie walleye fishery, a \$600 million-a-year industry, by half over the next decade.

"The mussels appear to have no natural predators in the Lakes," Turnbull said. Their presence has recently been confirmed in Lake Michigan and western Lake Ontario.

The mussels probably entered the Lakes in a ship's ballast tanks, and now, "shipping spreads it around the system," Turnbull said. "It's a very adaptable beastie, apparently; it's reproducing rapidly, and surviving the winters easily."

Researchers are now studying ways to eradicate the zebra mussel, if not throughout the Lakes, then at least locally.

But, Hebert said, "We're not going to find a 'magic bullet' (poison) like we did with the sea lamprey, because the mussels have no restricted breeding areas; we'd have to poison entire Lakes. We may have to look for predators or parasites."

The river ruffe, a medium-sized fish related to perch, is apparently still confined to the St. Louis River and harbor on Lake Superior, researchers there say.

"It's obvious that it has quite a firm footing in the estuary," according to Mike Hansen, a Great Lakes specialist

for Wisconsin's Bureau of Fishery Management. "It's quite abundant."

Gary Curtis, a biologist with the U.S. Fish and Wildlife Service, said "We're not at a point where we can say" whether the ruffe is disrupting the local ecosystem.

Researchers have predicted that the ruffe could squeeze out native fish, especially perch, much as the alewife once did throughout much of the Lakes. In one recorded case, the ruffe was first noticed in 1982 in a lake in Scotland, and by 1986 made up nearly two-thirds of all the fish in the lake. An explosion in ruffe populations could threaten the Lakes' \$4 billion-a-year sportfishing industry.

A joint Wisconsin-Minnesota-U.S. research effort is underway to gather some basic information on the ruffe, including what predator fish, if any, may be preying on them. "Unfortunately, it's a very good colonization species," Curtis said. "It breeds very well, and is a hardy little fish."

The open waters of Lake Superior are apparently too cold for the ruffe, Hansen said, but "The biggest fear is that it'll get into warmer areas of the system, like Lake Erie or Green Bay."

Eradication in the St. Louis River, Hansen said, "was contemplated early on, but how? We'd destroy one of the best native walleye populations in the Lakes, and nobody wants to do that."

Researchers believe the mussel and the ruffe, two of the Lakes' latest ecological invaders from other ecosystems, likely arrived in the ballast tanks of ships from Europe. And, Stanley noted, "it could happen again, anytime."

Canada's Coast Guard has, since April, asked all ships entering the St. Lawrence Seaway to exchange their ballast in the open ocean, in order to dump any freshwater organisms picked up in European ports.

Coast Guard spokesman Pat Strain said compliance with the voluntary program has been over 80%. About 1,000 ships enter the St. Lawrence after crossing the oceans each shipping season.

Stanley and Carlos Fetteroff, director of the Great Lakes Fishery Commission, said pressure is growing to make the program mandatory. Strain said, "We will take a look at the results in the spring, and consider making it compulsory. We're concerned about being able to police it."

Fetteroff said, "They may have to consider it sooner than that." Turnbull noted, "They have a nice high compliance rate. The thing is, though, it only takes one boat to bring something else in."

From The Great Lakes Reporter, Nov/Dec 1989

Vessel Groundings Pulverize Florida Reefs

Within 17 days in October and November, there were four major vessel groundings in the Florida Keys. Thousands of square meters of coral reefs were pulverized into rubble.

Three vessel groundings took place within the boundaries of Key Largo National Marine Sanctuary (NMS). Another

grounding, and probably the most destructive one, took place at Fort Jefferson National Monument in the Dry Tortugas.

The series of groundings began on October 24 when a 96-foot tugboat plowed into a coral reef in the Key Largo National Marine Sanctuary. The next day, a 155-foot freighter, the *Alec Owen Maitland*, smashed into a section of reef a mile and a half southwest of Carysfort Reef, also in the sanctuary.

A gash in the *Maitland's* hull let seawater into its forward ballast tank but did not affect the ship's fuel tanks, which contained 8,000 gallons of diesel. According to National Oceanic and Atmospheric Administration (NOAA) estimates, 1,610 square meters of reef, including both hard and soft corals, were damaged or destroyed. The area affected was largely composed of "drowned reef," or reef that is no longer living; however, it is necessary as a framework upon which future corals anchor themselves.

A few days later in the Dry Tortugas, the 475-foot *Marvo Vetricanic* plowed into a charted area containing patches of live hard and soft corals and sea grass beds. Two to three acres of coral were destroyed by the grounding and subsequent efforts to free the ship. For a few tense days, the possibility existed that the vessel, loaded with 14,300 tons of phosphates and 143,000 gallons of fuel for its journey to West Germany, might leak or break apart on the reef. Fortunately, though, after three days enough fuel was unloaded to refloat the freighter.

On November 10, yet another freighter, the 470-foot *Elpis*, ran aground in Key Largo NMS. The vessel, carrying 2,000 tons of sugar and 356 tons of heavy oil, rammed into a reef known as the Elbow and damaged over 3,000 square meters of reef area. Along its inbound path, the ship shaved off the tops of coral spurs and fractured coral ledges. The impact from the grounding crushed reef framework that had taken hundreds of years to form. In addition, when trying to free itself, the ship's propellers washed out two large excavations about eight feet deep, down to the bedrock. The sediment suspension created by this action caused untold damage to surrounding corals.

As with the *Exxon Valdez*, human error is probably to blame for the groundings since they all took place in well-charted areas in full view of warning lights. Currently, most southbound vessels "hug the reef" to avoid the powerful, northward-flowing Florida Current that feeds the Gulf Stream. Ships can reduce fuel costs and time by staying close to the reefs and taking advantage of weaker currents. However, these ships are jeopardizing southern Florida's ecological and economic future by leaving little leeway for error.

Both the state and the federal governments have filed claims in the Dry Tortugas grounding; the state is seeking \$10 million in damages and the federal government has a \$9 million lawsuit pending. In the marine sanctuary groundings, preliminary claims were filed and further legal action is proceeding.

When the National Marine Sanctuary Program was reauthorized in the fall of 1988, a clause was added that directs the money obtained through damage lawsuits back

Vessel Groundings cont.

into the sanctuary program, as opposed to diversion into the general U.S. Treasury fund as it did in the past. These monies can now be used for sanctuary activities, such as increased research and education, instead of feeding the Strategic Defense Initiative budget.

From Sanctuary Currents, Winter 1990

Our People

Paul Cuplin (AIFRB Member 1973) is now affiliated with Rivers West, a new consulting firm that addresses questions relating to the quantification and acquisition of instream water rights and provides planning services and the analysis, restoration, and management of streams, riparian areas, and upland watersheds.

Ray Johnson (AIFRB Emeritus 1975) has been awarded an Honorary Doctorate of Science by his alma mater, Doane College, in Crete, Nebraska.

District News

NORTHWEST WASHINGTON

Donald McCaughran, *Director*

The Northwest Washington District meeting on November 30, 1989 featured a program by Mr. Terry Stevens, Director of the Padilla Bay National Estuarine Reserve. Mr. Stevens spoke of the origin and present status of Washington's only Estuarine Reserve (Padilla Bay) and the possible future of two additional reserves, one along Washington's outer coast and one incorporating the San Juan Islands.

In 1979, the Washington State Department of Ecology began the effort to establish Padilla Bay, just east of Anacortes, as a Reserve. In 1980, NOAA awarded a grant to the state to acquire tidelands in Padilla Bay, develop access areas, construct an interpretive center, and begin research and educational programs. The present Reserve now covers 2,500 acres. The late Miss Edna Breazeale, on behalf of her family, donated 64 acres of prime land overlooking the bay as a site to locate Reserve facilities. The Breazeale-Padilla Bay Interpretive Center, dedicated in September 1982, has become a working model for many other National Reserves throughout the country.

The establishment of the Padilla Bay Reserve, which contains the largest eelgrass beds in the state, has not had smooth sailing. Only about half of the intertidal lands in Padilla Bay are owned by the Reserve. Most of the remaining lands are currently owned by a private development corporation which bought the lands so that a Miami-style housing development could be built once the bay was filled! The fight over development rights continues in the courts today, with the development corporation claiming that their right of development has been infringed upon.

The Padilla Bay Reserve serves three primary purposes: Conservation of estuarine habitats, Education, and Research. For about the last five years, NOAA has funded several

research projects per year in Padilla Bay, with much of this funding going to AIFRB members. Recently, the fledgling Padilla Bay Foundation, a non-profit corporation, was established to provide support for the management, operation, and development of the Reserve.

On January 11, 1990, the meeting topic was *Herschel vs. Steelhead*, presented by Bob DeLong of the National Marine Mammal Laboratory and Bob Pfeifer of the Washington Department of Wildlife. The speakers described the newest innovations in sealion management.

Meeting Announcements and New Publications

Coastal Conference

A 2-day conference, *Your Coast, Your Choice, Your Future*, will take place on February 28-March 1, 1990 at the Albany Hilton Hotel, Ten Eyck Plaza, Albany, New York. The conference will be sponsored by the New York Department of State, the New York State Senate Committee on Environmental Conservation, and the New York Assembly Committee on Environmental Conservation. This meeting will be the culmination of five regional conferences held in the fall of 1989 and will afford participants a unique opportunity to join with coastal experts, state and local officials, community and environmental activists, business leaders, and leaders in coastal affairs as they discuss a variety of topics related to the state's resources.

Subjects to be addressed are: More Growth—Can Your Coast Sustain It; Making Your Coast Accessible; Conflicts On The Water; Changing Landscapes; Regulating To Protect The Biological Health Of Your Coast; The Pervasive Pollutants; and The Threat Of Hurricanes And The Reality of Erosion.

For detailed information, write New York Department of State, Division of Coastal Resources and Waterfront Revitalization, 162 Washington Ave., Albany, NY 12231 or call (518) 473-2466.

Cephalopod Symposium

The American Malacological Union, at its annual meeting, will sponsor the *Gilbert L. Voss Cephalopod Symposium* at Woods Hole, Massachusetts in June 1990.

The 5-day meeting will feature discussions dealing with the capture and sampling of cephalopods, including the problems and difficulties associated with this task; review of gear types; natural conditions; variations among groups, including diurnal and seasonal variations; behavior of targeted species; desirable fishing methods; and technological developments which may enhance catching opportunities.

Information on program details, transportation, accommodations, and costs are available from Rathjen Associates, 480 St. Georges Court, Satellite Beach, Florida 32937.

Larval Fish Conference

The *14th Larval Fish Conference* and *Annual Meeting of the Early Life History Section* of AFS will be held on May 6-9, 1990 in the Duke University Marine Laboratory

Auditorium at Beaufort, North Carolina. For information write or call Stanley M. Warlen, NOAA, Beaufort Laboratory, Beaufort, NC 28516-9722. (919) 728-3595.

Shellfish Life History Symposium

A *Symposium on Shellfish Life Histories/Models* will take place on June 25-29, 1990 at the Universite de Moncton in Moncton, New Brunswick. Information can be provided by Dr. G. Y. Conan, Department of Fish. & Oceans, Gulf Fisheries Center, Box 5030, 343 Archibald St., Moncton, New Brunswick E1C 9B6.

Biochemical Genetics Symposium

The Fisheries Society of the British Isles will sponsor *An International Symposium on Biochemical Genetics and Taxonomy of Fish* on July 22-26, 1991 at Queen's University, Belfast, Northern Ireland. The symposium will review the application of isozyme, mitochondrial DNA, nuclear DNA, and RNA markers to the study of family and population- and species-level problems in natural and artificial stocks of fish. Information is available from Dr. Andrew Ferguson, Division of Environmental and Evolutionary Biology, School of Biology and Biochemistry, David Keir Building, Queen's University, Belfast BT9 5AG, Northern Ireland, UK.

Books by John Wiley & Sons

The following books are available from John Wiley & Sons, 605 Third Avenue, New York, NY 10157-0228: *Methods For The Microbiological Examination Of Fish And Shellfish*, by R. Austin and D. A. Austin.

Here is a timely book that describes methods for the isolation and characterization of bacteria, fungi, and viruses from fish and shellfish. Highlighting the current serological techniques, the authors discuss the modern methods used in fisheries microbiology.

These two experts provide you with disease diagnostic techniques and useful hints to aid in accurate findings. A sampling of chapter titles: Methods for sampling fish and shellfish; Clinical examination of diseased fish; Microflora of healthy animals; Bacteriological methods for diseased shellfish; Fungal pathogens. 317 pp. (1989). \$89.95.

How To Succeed As An Independent Consultant, 2nd Edition, by Herman Holtz.

A best-seller gets even better! Herman Holtz has revised and modernized his most popular book to reflect changes in the expanding consulting field. In this new edition, Holtz explains how the computer revolution has influenced the consulting business and how personal computers can make the daily life of the independent consultant a thousand times easier and more profitable.

Readers will find out about the latest government procurement rules affecting consultants, recent trends like the vogue of "consultative selling" and the broader range of technical and professional services now being purchased on a

consultancy basis. And of course this second edition delivers updated treatment of its well-regarded coverage of all the basics from setting up shop to proposal writing to fees and collections. 432 pp. (1988). \$22.95.

Guide to Environmental Careers

The CEIP Fund has published *The Complete Guide To Environmental Careers*, a 350-page 1989 book with photographs, case studies, and bibliography directed at opportunities in forestry, parks, and recreation; environmental planning; air and water quality control; hazardous waste management; land and water conservation; fishery and wildlife management; and solid waste management.

For recent graduates, career changers, volunteers, career counselors, and young professionals, this book is the only complete source available on environmental career opportunities. *The Complete Guide To Environmental Careers* presents the essential information needed to plan your career search: job outlook, salary levels, volunteer and internship opportunities, and entry requirements in the field, and includes chapters on career decision-making and job search strategies. Unlike other career guides, this book gives you an overview of the environmental field, as well as examples of the actual projects, jobs, and opportunities available. Case studies and in-depth interviews discuss how the staffs of environmental organizations manage and protect natural resources.

This book is available from The CEIP Fund, Dept. BKS, 68 Harrison Street, Fifth Floor, Boston, MA 02111-1907. The cost is \$24.95 (cloth); \$14.95 (paper).

Dissertation Abstracts

Comparative Ecology of the Parasites of the Spot, *Leiostomus xanthurus* Lacepede, and the Atlantic Croaker, *Micropogonias undulatus* Linnaeus (Sciaenidae), in the Cape Hatteras Region

Dennis A. Thoney, Ph.D. 1989

College of William and Mary in Virginia

Parasite communities of spot, *Leiostomus xanthurus*, and Atlantic croaker, *Micropogonias undulatus*, were examined to determine if (1) their structure changed with host age, (2) geographical location affects community structure, (3) food habitats affect community structure, and (4) their parasite communities are predictable. Juvenile fish were collected monthly from Chesapeake Bay and Pamlico Sound and adult fish were collected offshore north of Cape Hatteras in the fall, and offshore south of Cape Hatteras in the spring and fall. A total of 21 parasitic species occurred in juvenile spot with 19 in juvenile croaker from Chesapeake Bay and Pamlico Sound. The parasite communities of juvenile fishes varied with size, season, and area. Additional parasites were acquired as juveniles diversified their diets and fed on more intermediate host species. Equilibrium and, thus, diversity were depressed due to large numbers of the digenean *Diplomonorchis leiostomi* that dominated the parasite communities of both species. Although juvenile spot and croaker shared eight and six parasites between estuaries, respectively, many non-specific parasites (generalists) were more common in both spot and croaker from one estuary than the other. All species occurring in both hosts have indirect life cycles, suggesting that the availability of certain intermediate hosts as prey was important.

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Dissertation Abstracts cont.

The estuary of residence was clearly as important as host species identity in determining parasite community structure. Twenty-three species of metazoan parasites were recorded from adult spot and 25 from adult croaker. Of the 33 parasitic species found, 17 occurred in both spot and croaker. No significant differences in intensity of parasites occurred between sexes of either spot or croaker. All of the parasites had overdispersed or clumped distributions among hosts. Adult spot and croaker collected offshore had much greater species-richness, diversity, and total number of individual parasites than juvenile fishes collected in the estuaries. The number of species and diversity of parasites in adult fish was greater in croaker than spot. However, when only gastrointestinal helminths were considered, spot had greater species-richness as well as greater numbers of individual helminths, suggesting that they had a more diverse diet and fed on more infected intermediate hosts than croaker.

In both adult spot and croaker the mean number of parasitic species was greater than those of freshwater fishes and fewer than those for birds and mammals. The total number of individual parasites found in spot and croaker was similar to that of freshwater fishes. Comparison of adult spot and croaker parasite faunas collected offshore indicated that their respective parasite component communities were distinct and that similar infracommunity variability existed in both hosts. Although the parasite dominance hierarchy in adults of both species varied slightly between areas and seasons sampled, there appeared to be predictable dominant species consisting of *D. leiostomi* and *Scolex polymorphus unilocularis* in spot and *S. polymorphus unilocularis* in croaker. The core species were accompanied by subordinate, less-predictable species. The variability in both relative intensities and presence/absence of parasites within communities resulting from their diverse diets make them less predictable than those of other vertebrates with less diverse diets.

The Roles of Predation, Competition, and Exploitation in the Community Dynamics of the New River in West Virginia

Michael John Roell, Ph.D. 1989

Virginia Polytechnic Institute and State University

A model of the trophic dynamics among key macroinvertebrate and fish populations in the New River, West Virginia, was developed to help define the roles of predation, competition, and fishery exploitation in the food web of this large warmwater stream. The rates of production of the harvested crayfish (*Orconectes virilis*, *Orconectes sanbornii sanbornii*, and *Cambarus sciotensis*), hellgrammite (*Corydalis cornutus*) larvae, smallmouth bass (*Micropterus dolomieu*), rock bass (*Ambloplites rupestris*), and flathead catfish (*Pylodictis olivaris*) populations were quantified to evaluate the status of these stocks and to aid specification of the model. Analysis and application of the model were designed to address three research objectives, which were to (1) quantify the roles that predation, competition, and exploitation have in structuring the prey-predator assemblage, (2) evaluate through simulation the effects of multispecies exploitation, and (3) assess through simulation the impacts to the food web of reductions in aquatic insect production associated with the systematic control of black fly larvae in the New River.

The trophic basis of production of smallmouth bass, rock bass, and flathead catfish was primarily aquatic insects (in young fishes) and crayfish (in older fishes). Hellgrammites and prey fishes were inconsequential in that regard. Predation by these fishes (primarily smallmouth bass and rock bass) accounted for 76% of the production of ages-1 and -2 crayfish, and harvest by people was equivalent to 5% of crayfish population. Fish predation (primarily by rock bass) and harvest accounted for 14% and 8%, respectively, of the annual production of ages-1 and -2 hellgrammites. Anglers harvested the equivalents of about 91% and 12% of the annual production of fully-recruited smallmouth bass and rock bass, respectively; the extent of flathead catfish harvest was unclear.

Error analysis of the model suggested that "bottom-up" (food-limitation) effects were more important than "top-down" (mortality from predation) effects, interspecific and intraspecific competition, and exploitation in maintaining the structure of the prey-predator assemblage in the New River.

Exploitation was important in causing transitions in assemblage structure. Simulations of multispecies exploitation demonstrated that production and yield of populations are strongly dependent on food web interactions. Simulation of a 50% reduction in aquatic insect production, similar to that observed following poisoning of black fly larvae, predicted substantial declines in insectivores and their predators. Management of New River resources for maximum benefits to people will necessarily involve new approaches to addressing problems in a food web context.

Strain Differentiation and Detection of Infectious Hematopoietic Necrosis Virus

Scott Edward LaPatra, Ph.D. 1989

Oregon State University

The virulence of selected isolants of infectious hematopoietic necrosis virus (IHNV) were differentiated and correlated with electrophoretic mobilities of virion structural proteins by sodium dodecylsulfate polyacrylamide gel electrophoresis. A type 1 electropherotype of IHNV was more virulent for kokanee salmon (*Oncorhynchus nerka*) and a type 2 strain more virulent for rainbow trout (*Oncorhynchus mykiss*). Viruses from the Columbia River basin (electropherotypes 2 and 3) were more virulent for steelhead trout (*Oncorhynchus mykiss*) and IHNV electropherotypes from southern Oregon and California (type 3) were most virulent for chinook salmon (*Oncorhynchus tshawytscha*). Microscopic pathology induced by type 1 and 3 strains of IHNV in rainbow trout was less severe and involved fewer tissues than that caused by a type 2, providing further evidence that type 2 strains are more pathogenic for rainbow trout.

A fluorescent antibody test (FAT) was developed for the rapid detection of IHNV. The FAT was used for the detection of IHNV in blood smears and organ imprints from clinically infected juveniles and IHNV-infected cells in ovarian fluid from adult carriers. The test was equal in sensitivity to the plaque assay method and required less time to obtain a definitive diagnosis. Other sources of virus examined included cells contained in the ovarian fluid (OF) of sexually mature steelhead trout. Ovarian fluid from spawning steelhead trout determined to be virus-free was virus-positive when reexamined post-spawning. Results indicated that cells free in OF allowed replication of IHNV and could be used in diagnostic tests to detect this delayed virus expression. Infectious hematopoietic necrosis virus was also detected in mucus obtained from naturally infected juvenile and adult salmonids. In adult chinook and kokanee salmon, a higher prevalence of virus was detected in mucus collected from the external surface of fish than observed in standard specimens. Experimental infection of juvenile rainbow trout suggested IHNV detected in mucus was a result of the normal progression of disease and that the integument may have been a site of virus replication and a possible portal of entry.

In Memoriam

Allen C. DeLacy
AIFRB Emeritus 1978

July 25, 1989

Dr. Allen DeLacy, professor emeritus of the School of Fisheries, University of Washington, died on July 25.

Dr. DeLacy received his bachelor's, master's, and doctoral degrees in fisheries from the U.W. in the 1930s and 1940s. He worked as a fisheries research scientist for the International Fisheries Commission from 1934-36, for the U.S. Fish and Wildlife Service from 1936-42, and for the Washington State Department of Fisheries from 1943-47.

In 1947 he began his long and distinguished career as an assistant professor at the then College of Fisheries, became

an associate professor in 1951, and professor in 1958. He continued teaching until his retirement in 1977, when he was named emeritus professor. In addition, in the mid-1950s, Dr. DeLacy served as Acting Director of the School of Fisheries.

He will be remembered especially for his outstanding assistance to students. A scholarship fund is being set up at the School of Fisheries in Dr. DeLacy's memory.

William C. Herrington
1903-1989

William C. Herrington, 86, a retired "Ambassador for Fisheries" of the U.S. State Department and former official of the U.S. Bureau of Fisheries, died November 22, 1989 in Stafford Springs, Connecticut.

Herrington was born in Harvard, Illinois, attended high school in San Diego, studied engineering at California Institute of Technology, and graduated with honors in 1927 from Stanford University. He was a Phi Beta Kappa. He began his fisheries career working for the California Department of Fish and Game. He was employed by the International Pacific Halibut Commission from 1927 to 1930. From then until 1937, he was in charge of Atlantic Haddock Investigations for the U.S. Bureau of Fisheries. From 1937 to 1947 he was Chief of the North Atlantic Fishery Investigations, headquartered in Cambridge, Massachusetts.

Herrington served in the general headquarters of the Supreme Commander of the Allied Powers in Tokyo, Japan where he headed the Division of Fisheries and Wildlife from 1947 to 1951. Then, he was appointed Special Assistant and later Under Secretary for Fisheries and Wildlife in the Department of State and participated in many international fisheries negotiations. Among these were the treaty with Canada, Japan, and the United States which led to the establishment of the International North Pacific Fisheries Commission, the Great Lakes Fishery Convention between Canada and the United States, the renegotiation of the North Pacific Fur Seal Convention with Canada, Japan, the U.S., and the U.S.S.R., and the 1955 renegotiation of the Convention for Pacific Halibut between Canada and the U.S. He was also a delegate to the United Nations conferences on Law of the Sea. In 1966, he retired to Staffordville, Connecticut and was an adviser to the fishing industry and an Adjunct Professor at the University of Rhode Island Law of the Sea Institute. He had an

honorary doctorate from the University of Alaska, was a member of the Cosmos Club, and had received numerous commendations for meritorious service—one from General Douglas MacArthur.

Although best known for his international efforts, Herrington's contributions to fishery science are also of note. He credited his achievements to W. F. Thompson for the inspiration and training received while conducting research on albacore and clams in California. Herrington's research on tagging of Pacific halibut and on the population dynamics of haddock in the North Atlantic have been frequently cited by other biologists. Ricker's (1954) Stock and Recruitment paper (J. Fish. Res. Bd., Canada, Vol. 11) made extensive reference to the haddock studies as "the only example yet known" in which recruitment from a multi-aged spawning stock exhibited a steep dome-shaped relation. Ricker's last line in his discussion of recruitment curves was: "We are perhaps lucky to have, in Herrington's haddock, even one example of oscillation in which the effect of the reproduction curve can be identified with fair likelihood."

Updating that line and recognizing Herrington's contributions to international fisheries—"Biologists and industry representatives, alike, were lucky indeed to have had such a capable scientist and negotiator in the fisheries field." Evidence of his expertise can be found in his many publications on conservation and international affairs, the most recent which was published just last year (1989) in the Ecology Law Quarterly (University of California, Berkeley) and attests to his dedication despite the physical handicaps he confronted late in life.

Bill Herrington is survived by one daughter, two sons, six grandchildren and a host of devotees.

Membership Report

New Associates

Thomas E. Helser
Tung-Shi Huang

LA
FL

Sammy M. Ray, *Membership Chairman*
Texas A&M University at Galveston
Building 3311, Fort Crockett
Galveston, Texas 77551

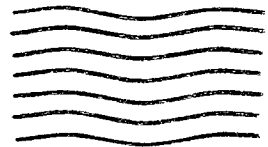
Direct membership inquiries to the Membership Chairman

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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Research Biologists*

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American Institute of Fishery Research Biologists

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APRIL 1990

Hugo

The biggest event in recent fisheries history occurred 21-22 September 1989—**HURRICANE HUGO**. Coastal and freshwater fisheries were severely affected in approximately one-third of South Carolina. Hardest hit by Hugo were the Santee-Cooper and Pee Dee drainages. It was estimated that 75% of fish in the Black River watershed, a drainage area in excess of 4,000 sq. km, were killed by low oxygen conditions that followed the storm. Determined graduate students documented dissolved oxygen concentrations in Coastal Plain streams of < 1.0 mg/l 8 hours after Hugo passed through. Decomposition of leaves and other organic debris from the storm, as well as the disturbance of sediments, were believed to cause the low oxygen conditions that lasted for up to 3 weeks. Commercial and recreational fishing industries suffered extreme damage to vessels, processing facilities, and other properties—only one commercial fishing pier remained on the South Carolina coast.

Federal Fisheries Budget

The second session of the 101st Congress convened on January 23, 1990. Some features of fisheries funding proposals for fiscal year 1991 are:

National Marine Fisheries Service

The President's request of \$154 million for FY1991 funding of NMFS programs is \$32 million less than FY1990 appropriations (\$186). However, this is still \$65 million more than was requested in the FY1990 budget. Despite other significant reductions, the Administration's proposal includes funding for the Regional Councils at the FY1990 level of \$7.2 million. Significant reductions for FY1991 include elimination of:

Research	(thousands)
Chesapeake Bay Studies	\$1,600
Atlantic Salmon	500
Oyster Disease Research	500

Management

Georges Bank Fisheries Mgmt.	471
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State and Industry Assistance

Grants to States	6,655
Fish Oil Research	942
Shellfish Water standards research	500
Model Seafood Inspection Program	330

In addition to other cuts in NMFS fishery program budgets, the Marine Recreational Fisheries Statistical Survey (MRFSS) has been zeroed out of the FY1991 budget. NMFS intends to request assistance from the U.S. Fish and Wildlife Service through their Wallop-Breaux program to continue the MRFSS. The request will be for administrative money off the top and would not effect state allocations.

Additionally, Director Bill Fox has reported that the FY1991 budget will not improve research vessels "days-at-sea". However, preliminary discussions on the FY1992 budget are focusing on a renewed funding priority for research vessels.

As a point of clarification on a previous report, NOAA Fishery programs did not suffer a Gramm-Rudman cut in the FY1990 budget. However, the 5.3% sequestration carried over into FY1991 through the end of February will translate into a cut of \$880,000 off the top of NOAA fishery program funding in the FY1991 budget.

Fish and Wildlife Service

The Administration is requesting a total of \$935 million for the USFWS FY1991 budget authority. This represents a 33% increase over FY1990 authorizations. However, some significant decreases are requested, including zero funding of anadromous fish grants to states (-\$1.4 mil.) and zero funding for the Emergency Striped Bass Study (-\$500,000).

Coastal Ocean Program Office

On February 12, 1990, NOAA's Estuarine Program Office (EPO) merged with NOAA's new Coastal Ocean Program Office (NCOPO) in Washington, D.C. Headed by Don Scavia, NCOPO will take over many of the functions of EPO and give NOAA the added focus and strength to tackle the tough challenges threatening the vitality of our coastal and

cont. on page 2

Coastal Ocean Program cont.

estuarine waters. The Coastal Ocean Program (COP) combines NOAA's scientific expertise and extensive resources to identify and initiate NOAA-wide activities to help the Nation solve immediate coastal crises and avoid or reduce future problems. Three critical goals form the core of the Program:

1. Improve prediction of coastal ocean degradation;
2. Improve conservation and management of living marine resources; and
3. Improve protection of life and property in coastal areas.

As part of the COP, a Coastal Ocean Council—made up of representatives from all NOAA line offices—identifies critical activities and prepares budget requests for each year. The Council submits their recommendations to the Under Secretary and the Assistant Administrators of NOAA, who approve the final plan. Specific multi-line office programs are implemented and managed by lead line offices, and NCOPO oversees and coordinates the overall program. The office also evaluates the need for program enhancements and resource allocation, and provides advice on critical program issues to the Under Secretary.

In this way, the NOAA line offices work collectively through NCOPO to identify activities and projects that will help solve major problems confronting our coastal oceans. Five broad areas have been identified to focus NOAA's efforts in fiscal years 1990 and 1991:

1. **Nutrient Overenrichment** - The impact excessive algal growth and associated oxygen depletion has on coastal environments and living marine resources.
2. **Estuarine Habitats** - The impact environmental change has on habitat structure and quality, and the living marine resources they support.
3. **Coastal Fisheries Ecosystems** - The impact that varying natural forces have on coastal and estuarine living marine resources.
4. **Toxic Chemical Contamination** - The impact toxic chemical contamination has on the coastal and Great Lakes' water and the living marine resources they support.
5. **Physical Impacts** - The impact episodic and persistent physical alteration have on coastal systems.

COP's \$6.4 million budget for FY1990 provides funds for a number of activities to address problems in several of these areas. NOAA will:

1. Study the bio-effects of contaminants in our coastal waters and conduct intensive studies in two highly contaminated areas—Tampa Bay and the Hudson-Raritan Estuary.
2. Research seagrass and tidal wetland habitats with focused attention on the effects of nutrient enrichment, diversion of freshwater flows, and wetland habitat loss and alteration.
3. Conduct studies on the Mississippi River plume and the Louisiana continental shelf to examine the effects anthropogenic nutrient enrichment has on the primary production and quality of coastal waters.

4. Continue CoastWatch in the South Atlantic region and the Chesapeake Bay. CoastWatch-Water combines remote-sensing and conventional data to detect and track unusual events (i.e. red tide, noxious algal blooms) in coastal waters.

5. Initiate CoastWatch-Land, which uses land remote-sensing to inventory, classify, and analyze change in wetland habitats, to support change analysis and prototype development in the Chesapeake Bay.

To get vital data and information into the hands of scientists and decisionmakers, NOAA will improve its existing network of communication and information transfer. In FY1990, NOAA will:

1. Enhance its Coastal Ocean Management Planning and Assessment System (COMPAS). This user-friendly desktop information system will enable coastal states to bring together disparate information on the Nation's coastal ocean and will help resource managers identify strategies to improve the environmental quality of the ocean. NOAA will work with coastal resource managers in Texas this year to demonstrate and evaluate COMPAS.

2. Continue development of IMAFS, a computer system that integrates analysis/display, data base management, and communications interface, designed for research and operations based on the interplay of physical and ecological data.

3. Upgrade NOAA's Ocean Communications Network (NOCN) by improving the Beaufort, NC system and adding telecommunication capabilities to three more sites—the fisheries laboratory in Narragansett, RI, and at the Environmental Research Laboratories in Seattle, WA, and Ann Arbor, MI. NOCN will provide computer-to-computer coastal ocean data exchange within NOAA, federal, state, and local government communities.

The initial success of the Coastal Ocean Program is evident—the President is requesting \$17.4 M for the Coastal Ocean Program in FY1991—a 172% increase over the FY1990 budget! The Program office is working with NOAA line offices to identify activities and develop plans for FY1991 and beyond. These include expanding programs in Nutrients, Toxics, Estuarine Habitats, CoastWatch, COMPAS, and other data and information management and delivery efforts. COP will also initiate significant expansions in Coastal Fisheries Oceanography and NOAA's ocean observation network of buoys, ships, and other platforms to meet the research needs required by NOAA and other agencies.

NCOPO plays a vital role in coordinating NOAA programs with other federal, state, and local agencies. As coastal issues become more complex and demanding, NOAA—through the Coastal Ocean Program—intends to play a greater role in the national effort to resolve the challenging issues confronting our coastal oceans.

To See Ourselves As Others See Us

Daniel E. Koshland, Jr.
Editor, *Science*

The words of Robert Burns, "O wad some Pow'r the giftie gie us to see oursels as others see us!" are as

applicable to scientists as they are to all other individuals. As we make our New Year's resolutions, this may be an important admonition to remember while we strive to preserve the health and vitality of scientific institutions. As science has become more visible and more powerful, it has also attracted more armchair critics and more adversaries. The visibility delights, but the criticism bewilders. We see ourselves as out to do good and to increase the standard of living, yet we are accused of torturing animals, polluting the environment, embarking on megaprojects of little interest to the populace, and tampering with the genetics of natural species. While most of these types of charges can be answered, and some of them are demonstrably false, most scientists would agree that others may have some substance. When the public has been asked to vote, it has supported science on most issues. But there appears to be growing skepticism toward science and a willingness by the public to believe illogical alternatives.

It is vital that scientists sensitize themselves to public concerns and address them in a compassionate and candid way. It is probably hopeless to convert the extremists—the no-animals-in-research, no-pesticides, no-genetic-engineering, and no-progress crowds—although careful answers to each of their positions should be developed. It is more important to understand why a portion of the general public is sympathetic to the argument that science can produce more harm than good.

The most unsettling feature of science is probably the rapidity at which it changes cultural values. When science was curing a few diseases and producing a few labor-saving gadgets it was viewed with unmitigated awe and respect. Now, the speed of scientific advances threatens to alter values faster than the social system can accommodate to such change. Sydney Brenner's statement that a modern computer hovers between the obsolescent and the nonexistent illustrates the speed of advances in modern science. If practitioners of science then talk in a language that is not easily understood or retreat into their laboratories, the problem is exacerbated. Birth control pills, automobiles, and increased longevity are all admirable, yet they have brought major changes in the sexual mores, family mobility, and lifestyle of all of us.

The practice of science is opportunistic. We solve the problem that is before our eyes and are not required to predict the widespread ramifications that result if the solution is more popular than we expect. No one can assess at the inception of an invention all of its social implications. We could not predict that an understanding of radio waves would change the way we communicate, that understanding control of bacterial growth would lead to a population explosion, or that a simple equation, $E = mc^2$, would change the nature of warfare. But as architects of change, we have occasionally oversold the product, implying that it will bring unmixed good, not acknowledging that a scientific advance is a Pandora's box with detriments or abuses as well as benefits. By confessing that we are not omniscient we may lose some awe and admiration, but we will gain in understanding and rapport.

Ultimately society controls the rules of scientific application mainly by its control of funding. We of course have the option to work for organizations of which we approve and the citizen's right of political advocacy. Scientists are the servants of society, not its masters, and we should remain so. But because we are close to the events of change, it is our special responsibility to spell out the disadvantages as well as the advantages of a new discovery as far as we can. What is good for science is not necessarily good for the country, and we should be particularly cautious in endorsing megaprojects (or microprojects) that compete for dollars in a significant way with other needs of society.

It is the nature of scientists to advocate change more than most people do. The increasing complexity of science, furthermore, requires language that is unfamiliar outside the scientific community. This tempts some to accuse us of being a secret cabal that embarks on projects society would reject if it had a chance to do so. The antidote is to explain the serendipitous nature of science, to display our own limitations with candor, to express our intentions and reservations in clear, nonspecialized terms, and to empathize and communicate with those whose lives will be changed by discoveries now being made in mysterious laboratories and published in esoteric journals.

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It appeared in Science, Jan. 5, 1990, Vol. 247, p.9. Copyright 1990 by the A.A.A.S.

Meeting Announcements and New Publications

Great Lakes Wetlands Workshop

International Workshop: Wetlands of the Great Lakes—Status of the Science Base; Protection and Management Options and Needs will take place in Niagara Falls, NY on May 17-19, 1990. This workshop, sponsored by the Association of State Wetlands Managers, Box 2463, Berne, NY, will examine the distribution of Great Lakes wetlands, their functions and values, threats to them, pertinent government policies now in effect, potential future policies, restoration opportunities, and research needs. Information is available from the sponsors.

Symposium—Water Resources Systems

An International Symposium on Water Resources Systems Application is being organized by the Civil Engineering Department of the University of Manitoba in Winnipeg, MB. The symposium will be held on June 12-15, 1990 with the objective of providing an interdisciplinary forum for review of the application of systems analysis in the area of water resources. Plenary and topical sessions will bring together international specialists in water resources and related sciences to present the results of practice and research, to

cont. on page 4

Meeting Announcements cont.

create an opportunity for communicating the experiences representative of the various countries, and to point the way to needed activities for the future.

Registration and conference information is available from S.P. Simonovic, Civil Engineering Department, University of Manitoba, Winnipeg, MB R3T 2N2.

Fish Health and Disease Workshop

A joint meeting of the Fish Health Section of the American Fisheries Society and the Midwest Disease Workshop will be held on July 15-18, 1990 in Minneapolis, MN. For information, write Dr. Paul R. Bowser, Department of Avian and Aquatic Animal Medicine, Cornell University, Ithaca, NY 14853.

Southeastern Association Conference

The 44th Annual Conference of the Southeastern Association of Fish and Wildlife Agencies will be held at the Richmond Marriott, 500 East Broad Street, Richmond, VA 23219, October 21-24, 1990.

"All papers must comply with the manuscript guidelines, published as a special supplement at the end of the 1985 Southeastern Proceedings (Volume 39). Manuscripts not adhering to these guidelines will be returned to the authors without review."

The deadline for submitting technical papers to the appropriate program committee is May 1, 1990. Papers received after this deadline will not be considered. Non-technical session papers are to be submitted to the program chairperson by the meeting date. All authors will submit five (5) copies of their paper in final form to:

Wildlife Associate Editor: Dr. Michael Vaughn, Department of Fisheries and Wildlife Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

Fisheries Associate Editor: Dr. William Kelso, School of Forestry, Wildlife and Fisheries, Forestry, Wildlife and Fisheries Building, Louisiana State University, Baton Rouge, LA 70803.

Information and Education Program: Mr. Jeff Curtis, Virginia Department of Game and Inland Fisheries, 4010 West Broad Street, Richmond, VA 23230.

Law Enforcement Program: Major Lewis Brandt, Assistant Chief, Law Enforcement Division, Virginia Department of Game and Inland Fisheries, 4010 West Broad Street, Richmond, VA 23230.

Hunter Safety Program: Capt. Herb Foster, Virginia Department of Game and Inland Fisheries, 4010 West Broad Street, Richmond, VA 23230.

Legal Program: Melissa L. Trippe, Assistant Attorney General, State of North Carolina, P.O. Box 629, Raleigh, NC 27602. (919) 733-6026.

Poster presentations are invited in all programs. They are particularly appropriate for displaying techniques, methods,

etc. If you plan to submit for poster consideration, you need submit only an abstract to the appropriate associate editor or program chairperson by May 1, 1990. Poster presentations are not published in the Proceedings. Please indicate with your abstract that you are submitting for the poster session. A poster session will be held only if sufficient posters are submitted. For more information contact Gary Martel, Virginia Department of Game and Inland Fisheries, (804) 367-1000.

Great Lakes Wetlands

The first issue of *Great Lakes Wetlands* has been issued. It is being distributed free of charge to 5,000 organizations, environmental professionals, and individuals in the Great Lakes basin. The newsletter will be published quarterly, and will provide detailed information on the management and protection of Great Lakes wetlands, and on research on their functions and values.

Great Lakes wetlands are a diverse and exciting resource, as varied as coastal marshes and inland swamps. The Great Lakes ecosystem spans numerous jurisdictional boundaries, including eight states, two provinces, and two nations. Wetlands play diverse and important roles in maintaining the ecological integrity of this ecosystem. In issues to come, this newsletter will explore some of the challenges of understanding and managing the region's enormously valuable wetland resource.

Each issue of the newsletter will feature two major articles. The first will describe an important wetland policy issue in the region. The second will present the results of research on wetlands in the basin. All of the articles will be written in language accessible to non-experts.

The newsletter is intended to serve as a regional forum for exchange of ideas and information on wetlands. We hope that by encouraging interdisciplinary exchange, it will foster deeper communication among the individuals and organizations involved in studying, protecting, and managing the region's wetlands.

Great Lakes Wetlands is made possible by a grant from the Charles Stewart Mott Foundation. Special thanks go to the many organizations that helped assemble the mailing list, including the Center for the Great Lakes, Great Lakes United, The Association of Wetland Managers, The Society of Wetland Scientists, the Environmental Law Institute, and The Lake Michigan Federation.

To receive this newsletter, write Stephen Brown, Great Lakes Wetlands, Box 300, Conway, MI 49722.

Recreational Fisheries

William F. Sigler (AIFRB Fellow 1960) and John W. Sigler (AIFRB Associate Member 1980) have authored *Recreational Fisheries—Management, Theory, and Application*. To be published by the University of Nevada Press, this 425-page has photographs, line drawings, and tables. It will be available in June 1990, and can be ordered for \$45.00 from the University of Nevada Press, University of Nevada, Reno, Reno, Nevada 89557-0076.

In this useful book, two seasoned fisheries management specialists present principles and techniques designed to deal with problems that commonly arise in the everyday life of a fisheries management professional.

In the early chapters of the book, the authors identify where the study of fisheries science originated and discuss the biases it has carried into the 1980s. They explore how a fisheries biologist must deal with legal requirements, state rights versus federal mandates, and legal precedents such as the Endangered Species Act and the Wild and Scenic Rivers Act. The Siglers also address theories, concepts, and principles associated with conducting fisheries investigations and explore how best to use that information to make informed decisions regarding aquatic resources.

Recreational Fisheries also covers major data collection techniques and their applications in relation to poisons, anesthetics, nets, and electrofishing. Problem-solving techniques are outlined as well in regard to electrofishing, food habits, ecology, and the role of hatcheries.

Recreational Fisheries will be a valued addition to existing literature, especially in light of the in-depth coverage of topics never seriously discussed before, such as the role of administrators and the usefulness of public relations. Moreover, fisheries management professionals and students alike will welcome the Siglers' recommendations regarding nontraditional approaches to dealing with old problems.

Books by CRC Press

CRC Press, Inc., 2000 Corporate Blvd. N.W., Boca Raton, Florida 33431 announces publication of the following fishery and fishery-related books:

Alternatives in Regulated River Management, edited by James A. Gore and Geoffrey E. Petts.

Contents:

Water Quality Problems

Water temperature, dissolved oxygen, and turbidity control in reservoir releases. Water quality modeling of regulated streams. Flushing flow requirements.

Channel Modification and Management

Alternative channelization procedures. Channel engineering and erosion control. The use of instream habitat improvement methodology in mitigating the adverse effects of river regulation on fisheries. Flood plain fisheries management. Mitigation for impacts to riparian vegetation on Western Montana streams.

Ecological Modeling and Management

Models for predicting benthic macroinvertebrate habitat suitability under regulated flows. The application of a classification and prediction technique based on macroinvertebrates to assess the effects of river regulation. Instream habitat modeling techniques. Alternative approaches in predicting trout populations from habitat in streams.

Index.

360 pp., 7 x 10, 1989, U.S. \$169.00/Outside U.S. \$199.00

Reproductive Seasonality in Teleosts: Environmental Influences, edited by Angus Munro and T. J. Lam.

Contents:

General Introduction

General Concepts of Seasonal Reproduction

Salmonids

Cyprinidae

Sticklebacks

Estuarine and Intertidal Teleosts

Environmental Influences on Reproductive Seasonality in

Temperate Marine Teleosts

Tropical Freshwater Fishes

Index.

272 pp., 1990, U.S. \$145.00/Outside U.S. \$170.00

Handbook of Marine Mammal Medicine, edited by Leslie A. Dierauf.

Contents:

Medicine

Surgery

Pathology

Natural History

Physiology

Feeding and Housing

Husbandry and Medicine

Strandings

Appendixes

Index.

752 pp., 246 illustrations, 7 x 10, 1990, U.S. \$149.95/

Outside U.S. \$176.00

Fish Culture in Warm Water Systems, Problems and Trends, edited by Moshe Shilo and Shmuel Sarig.

Contents:

Introduction and State of the Art of Aquaculture

Selective Breeding of Cultivated Fishes

Principles of Fish Nutrition

Production of Commercial Feeds for Warm Water Fish

Environmental Factors in Fish Culture Systems

Bacterial Disease in Warm Water Aquaculture

Parasites and Associated Disease in Fish in Warm Water

Culture, with Special Emphasis on Intensification

Fish Reproduction: Its Physiology and Artificial

Manipulation

Index.

340 pp. 7 x 10, 1989, U.S. \$169.00/Outside U.S. \$176.00

Cutthroat Trout Stocks

Robert E. Gresswell has edited *Status and Management of Interior Stocks of Cutthroat Trout*. The American Fisheries Society has published this 140-page volume as AFS Symposium 4, and sells it for \$22 in hard copy and \$15 in paper.

The book covers the life histories, population status, and management of seven stocks of inland cutthroat trout—the Yellowstone, westslope, greenback, Colorado River,

cont. on page 6

Meeting Announcements cont.

Rio Grande, Lahontan, and Bonneville. Accounts are given of the past wide distributions of the different stocks, how they have changed, and how man's activities have brought about these changes through damming and dewatering, overexploitation, habitat alteration, and introductions of non-native salmonids. This volume discusses current management practices and the hope for conserving the remaining stocks.

The book can be purchased from The American Fisheries Society, 5410 Grosvenor Lane, Bethesda, MD 20814.

Reservoir Fisheries Databases

The Institute of Statistics at North Carolina State University, under contract to the U.S. Fish & Wildlife Service, recently updated four national databases on reservoir fisheries through 1988. The databases were initially compiled and maintained by the former USFWS National Reservoir Research Program and updated with help from state fish and wildlife agencies in all 50 states and Puerto Rico. The four databases consist of descriptive physiochemical data for over 600 reservoirs, angler use and sport fish yield data for over 1,600 reservoir-years, fish standing crop data, by species, for over 2,500 reservoir-years, and inch-class standing crop and density data, by species, for over 1,000 reservoir-years.

The databases are currently configured for retrieval of data using the SAS System on a mainframe computer. Copies of the databases can be obtained from: Southeastern Wildlife & Fisheries Statistics Project, Institute of Statistics, North Carolina University, Box 8203, Raleigh, NC 27695-8203, or (919) 737-2531.

Aquatic Species Introductions

The Food and Agriculture Organization of the United Nations has issued FAO Fisheries Technical Paper 294, entitled *International Introductions of Inland Aquatic Species*. This volume has 318 pages, costs \$15.00 in paper, and is available from UNIPUB, 4611-F Assembly Drive, Lanham, MD 20706-4391.

This is a complete revision of FAO Technical Paper 237, and summarizes introductions of 237 species into 140 countries. The book contains an overview of exotic introductions and a Register of International Introductions of Inland Aquatic Species. Each species account includes native range, country introduced, year, reason, reproductive success, and comments.

Thesis and Dissertation Abstracts

Mitochondrial DNA Variation in Striped Bass, *Morone saxatilis*, From the Rappahannock River, Virginia

Carol Furman, M.A. 1989

College of William and Mary in Virginia

Restriction endonuclease analysis of mitochondrial DNA was used to examine genetic variation of striped bass, *Morone*

saxatilis, within the Rappahannock River, Virginia. Ovarian tissue from twenty-three gravid females was collected in the spring of 1986. Mitochondrial DNA was isolated and digested with 4 restriction enzymes: Hind III, Eco RI, Eco RV, and Bcl I. Five size polymorphisms ranging from 17.5-17.8 kilobases were identified and designated as genotypes A, B, C, D/E, and F. The D/E genotype is heteroplasmic and contains 2 different size molecules, 17.65/17.75 kilobases within the mitochondria.

These data were compared with published and unpublished data to determine if Rappahannock striped bass are distinct from those in regions of the Upper Chesapeake Bay, and whether genotypic frequencies within the Rappahannock River remain constant year after year. Comparisons of genotypic frequencies of striped bass from the Rappahannock River and the Potomac River, Choptank River, and Worton Point in 1984 and 1986 suggest that Rappahannock *M. saxatilis* are genetically distinct from those in the Potomac River and may be distinct from those in the Choptank River and Worton Point.

Comparison of genotypic frequencies found in Rappahannock striped bass in 1984, 1986, and 1987 produced controversial results which may or may not indicate that the distribution of genotypes remained fairly constant. Based on reported molecular weights alone, a sudden shift in frequency distribution is difficult to explain in light of past tagging studies which support homing in female striped bass. However, after a direct comparison of samples representing the data sets involved, no differences in migration distances were observed. This supports the conclusion that frequencies remained generally constant between 1984, 1986, and 1987, and that female striped bass do return to the natal river to spawn. Although these data are preliminary and should not be used for management purposes, they provide a basis for additional studies already under way to identify stocks within the Chesapeake Bay.

Meristic and Morphometric Comparison of Three Juvenile *Alosa* Species—Blueback Herring, *A. aestivalis*; Alewife, *A. pseudoharengus*; and American Shad, *A. sapidissima*

Joseph C. Desfosse, M.A. 1989

College of William and Mary in Virginia

Meristic and morphometric characters of juvenile blueback herring, *Alosa aestivalis*; alewife, *A. pseudoharengus*; and American shad, *A. sapidissima*, were examined from samples collected from major Atlantic coast rivers during 1978 to 1980 to determine whether these characters would be of use in stock discrimination. In contrast to such previous investigations of *Alosa* species, multivariate statistical techniques were employed in this study to examine both spatial and temporal effects.

Univariate descriptive statistics (mean, mode, standard deviation, standard error, and the frequency distribution) were calculated for each meristic character. No consistent patterns of variation from year to year, or from area to area,

were noted. Regression analysis of each meristic character (dorsal, anal, left pectoral and left pelvic fin rays, anterior and posterior scutes), determined that they were independent of total fish length.

Multivariate analysis of variance (MANOVA) was performed separately for the meristics and morphometrics. In both cases, a significant interaction effect precluded interpretation of significant main effects. Within the realm of MANOVA, the simple effects of areas within each year and years within each area were examined. Significant differences were found for both simple effects.

Analysis of covariance (ANCOVA) of each dependent morphometric character (snout, upper jaw, head, postorbital, preopercular, predorsal, and preanal length, head and body depth, head width, orbit diameter, and dorsal to anal fin and dorsal to pectoral fin distance) on the independent variable of total length indicated significant regression relations (100% of the relationships). A majority (76.3%) of the relationships tested by covariance indicated that slopes were equal and that elevations of the regression lines were significantly different (87.8%). No consistent pattern was found throughout the covariance analyses to explain deviations from this.

Significant differences in the characters examined were found between the areas sampled, but temporal variation confounded the spatial differences. Meristic and morphometric studies need to take into account both spatial and temporal variation in the data.

Spatial and Temporal Feeding Patterns and Dietary Resource Utilization of the Sand Flounder, *Scophthalmus aquosus* (Mitchell), From the Inner New York Bight

Barbara E. Warkentine, Ph.D. 1990

City University of New York

To determine the dietary resource utilization for resident populations of the sand flounder of the New York Bight a series of stations, covering a span of 133.3 km, was established along the Bight's western arm. These stations extended from Absecon Inlet, N.J. in the south to Breezy Point, N.Y. in the north. The stations were sampled during June and November of 1984, April and July of 1985, and January 1986. This schedule allowed for the establishment of a sampling protocol designed to gain information on the spatial and temporal feeding patterns of this species.

Analysis revealed that the mysid shrimp, *Neomysis americana*, accounted for greater than 90% of the sand flounder's diet throughout the sampling range and during all seasons except January 1986. During January the dominant prey consumed was the mysid *Mysidopsis bigelowi*. Other important, but not dominant, food items consisted of sand shrimps, amphipods, nematodes, crabs and crab larvae, isopods, polychaetes, and fish. Application of the Manly preference index and the electivity index of Vanderploeg and Scavia determined that mysids were the preferred food item for this fish throughout its range and over all sampling seasons.

The resident sand flounder co-occurs in this region with seasonally migrating flatfishes, i.e. the winter, summer, fourspot, smallmouth, and yellowtail flounders. A working hypothesis that the diet of the sand flounder would change as these other flatfish move into and out of its region was tested. This hypothesis was falsified. Mysids remained the dominantly preferred food item taken by the sand flounder regardless of the presence of other potentially competing flatfish in its foraging field. Although a seasonal difference in consumed mysids was observed, this difference was found to reflect a seasonal change in the dominance of the species representing the mysid fauna rather than interspecific interactions between co-occurring flatfish. Further, these fish were found to have very little dietary overlap. There appears to be very little dietary competition between sand flounders and other co-occurring flatfish.

Ontogenetic dietary shifting was not observed for the sand flounder. Size-classes of sand flounders examined in this study ranged from 3.0 to 27.0 cm standard length, and all fish fed dominantly on small crustaceans; thus, no evidence of dietary gape-limitation was found.

Membership Report

New ASSOCIATES

Joseph M. DosSantos	MT
Thomas Baudanza	NY
Karen Riva Murray	NY

New MEMBERS

Dr. Russell Nelson	FL
Joyce H. Andrew	CA
Lawrence S. Buklis	AK
Dr. Michael L. Cuenco	OR

Promotion to MEMBER

Dr. Raymond M. Newman	MN
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Promotion to FELLOW

Dr. Vishnu P. Saksena	OH
Dr. Charles H. Hocutt	MD
Dr. Churchill B. Grimes	FL

EMERITUS

Dr. Durbin C. Tabb	FL
Alan B. Groves	WA
Robert J. Ayers	WA

Sammy M. Ray, Membership Chairman
Texas A&M University at Galveston
Building 3311, Fort Crockett
Galveston, Texas 77550

Direct membership inquiries to the Membership Chairman

6A

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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JUNE 1990

AIFRB Annual Meeting—1990

The 1990 annual meeting of AIFRB's Board of Control will take place on August 25-26, 1990 at the Pittsburgh Hilton, Pittsburgh, Pennsylvania. The American Fisheries Society and the International Association of Fish and Wildlife Agencies will convene at the Pittsburgh Hilton on August 26-30.

President Charles F. Cole will call the AIFRB meeting to order at 8:30 a.m. on Saturday, August 25, and will conduct the business of the Board for the 2-day session. AIFRB members are encouraged to submit agenda items to President Cole prior to the meeting, and all Associate Members, Members, Fellows, and Emeritus Members are welcome to attend the session.

AGENDA

Call to Order

Adoption of Agenda

Introduction

Determination of Quorum Present

1. Approval of Minutes of 1989 Meeting at Anchorage and Secretary's Report (Nakatani)
2. President's Report (Cole)
3. Treasurer's Report (Rachlin)
4. Report on publications
 - A. Report of BRIEFS Editor (Cope)
 - B. Report of Production Editor (Merriner)
5. Report of Membership Committee (Ray)
6. Report on awards
 - A. Travel Assistance Awards (Rachlin)
 - B. W. F. Thompson Best Paper Award (Cole)
 - C. Outstanding Achievement Award (Cole)
7. Reports from District Directors
8. Other Business
9. New Business
 - A. Plans for new Secretary (Nakatani)
 - B. Arrangements for 1991 meeting
 - C. New appointment for Awards Committee (Cole)
10. Transfer of chair to incoming President Helle (Cole)
11. Adjournment

1990 Travel Assistance Awards

Dr. Joseph W. Rachlin, AIFRB Travel Awards Program Chair, announced that selections have been made for awards to four associate members of AIFRB to help the recipients present aspects of their research at national meetings. \$1000 will be distributed among the winners. The selectees, their affiliations, and abstracts of their papers are presented here:

Mr. Robert A. McConnaughey, a Ph.D. student of Prof. David Armstrong, University of Washington, will be presenting a paper on aspects of his thesis work at the ICES Shellfish Life History and Shellfishery Models Symposium in New Brunswick, Canada, June 1990.

INTERANNUAL VARIATION IN DISTRIBUTION AND ABUNDANCE OF SETTLEMENT STAGE DUNGENESS CRAB, *CANCER MAGISTER*, ALONG THE COAST OF WASHINGTON, USE, AND RELATIONSHIPS TO ENVIRONMENTAL VARIABILITY.

Commercial stocks of the Dungeness crab, *Cancer magister*, fluctuate widely along the Pacific Coast of the United States. Previous attempts to explain this interannual variability have relied on time-lagged relationships between physical features of the environment during the planktonic larval phase and subsequent commercial landings. These efforts have been largely unsuccessful, in part, because the multi-year class composition of the catch is not accounted for by a simple time lag (typically 3 or 4 years).

We examine the influence of environmental variability on spatial patterns and year class strength measured at the time of settlement to the benthos using 6 years of trawl survey data collected along the coast of Washington state. Monthly estimates of first-instar abundance within two coastal estuaries and the adjacent nearshore are compared with cross-shelf transport during the preceding 3-4 month pelagic larval phase. Transport inferences are based on time series of Bakun wind data and corrected sea level for the survey area. Results are discussed in light of the prevailing, albeit problematic, model for Dungeness crab recruitment.

Mr. David Bushek, a Ph.D. student of Dr. Standish K. Allen, Jr., Rutgers University, presented a paper on his research at the National Shellfisheries Association meeting in Williamsburg, VA, April 1990.

cont. on page 2

Awards cont.

EFFECTIVE POPULATION SIZE FOR SHELLFISH BROODSTOCK MANAGEMENT: CONFLICTS BETWEEN THEORY AND PRACTICE.

The goal of a shellfish hatchery is to produce uniform, high-quality spat. Initially, domestication of the species and strong selection for obvious, commercially important traits (e.g., fast growth, disease resistance) will tend to decrease genetic diversity through the loss of alleles. In the long term, continued selection will improve the stock's performance under more specific conditions, but this is limited by the amount of genetic diversity present.

Much has been written about the importance of maintaining genetic diversity in domesticated agricultural species. This is no less important for hatchery-produced shellfish, but the biology of shellfish creates unique problems. Population genetic theory demonstrates that loss of genetic diversity is inversely related to effective population size (N_e). Several factors, sex ratio and family size in particular, can be used to maximize N_e , but practical methods that are sensitive to the commercial realities of shellfish production have not been developed.

Using data from the Rutgers Cape Shore Hatchery, this paper will first examine the practical problems of maintaining a large N_e , then describe a practical method of repeated spawning for increasing N_e without slowing down the selection process or dramatically increasing labor.

Mr. Tung-Shi Huang, a Ph.D. student of Dr. Cheng-i Wei, University of Florida, will present a paper on aspects of his research at the June 1990 Annual Meeting of the Institute of Food Technologists in Anaheim, CA.

QUANTIFICATION OF SHRIMP IN SHRIMP-SURIMI MIXTURE USING AN ISOELECTRIC FOCUSING TECHNIQUE.

A method to quantitate the percent content, by weight, of shrimp in Alaska pollock surimi-pink shrimp mixtures was developed by comparing the peak areas of two surimi- and shrimp-specific (pI 7.11 and 7.17, and pI 5.46 and 5.52, respectively) protein bands on isoelectric focusing gels with an equation describing the linear relationship between peak areas and protein content from the standard samples of surimi, shrimp, and surimi-shrimp mixtures. Using this method, unknown mixtures containing 10, 12.4 and 5.7% pink shrimp, respectively, were determined in blind studies to contain 11.3, 12.6 and 5.8% shrimp.

Mr. Jon S. Chen, a Ph.D. student of Dr. Cheng-i Wei, University of Florida, will present a paper on his thesis research at the June 1990 Annual Meeting of the Institute of Food Technologists in Anaheim, CA.

COMPARISON OF PHENOLOXIDASE ACTIVITY FROM FLORIDA SPINY LOBSTER AND WEST AUSTRALIAN LOBSTER.

Polyphenoloxidase (PO) isolated from West Australian lobster (*Panulirus cygnus*) and Florida spiny lobster

(*Panulirus argus*) catalyzed catechol at a higher affinity than DL-B-3, 4-dihydroxyphenylalanine (DL-DOPA). The Florida lobster PO showed a higher substrate specificity than that of the Australian lobster. The two enzymes exhibited the optimal pH stability at 7.0, but differed with respect to pH optimum, activation energy, and thermal stability. Electrophoretic patterns using SDS-PAGE indicated the PO isolated from both lobster species had two isoforms but with different molecular weights.

How To Make An Editor Happy

The way to a man's heart is through his stomach; the way to a BRIEFS editor's happiness is through submissions for publication.

Often, as deadlines for sending copy to the printer draw near, the BRIEFS editor must face the fact that he needs more material to fill eight pages. Many AIFRB people are generous and thoughtful in sending items for our newsletter, but the membership could do better in transmitting material to the editor. There is a wealth of news out there—it just takes some imagination and some action to forward information on fisheries and fisheries people so *your* publication can be better.

We need photographs of our people in action at District meetings and at work; news of deaths of members; news of honors our people receive; District meeting programs; interesting short articles and editorials we can reprint; original writings by our members; and many other items that would interest our readers.

Your editor loves his job, but, please, make his work easier and the product better by sending him something for BRIEFS. Items dealing with freshwater fisheries are especially welcomed.

RAMAS

RAMAS (Risk Analysis and Management Alternative Systems) is a fish population dynamics model used to predict the impact of utility operations on an aquatic ecosystem.

Thermal and chemical discharges from power plants have the potential to impact ecosystems. Mortality of fish is of special concern because fisheries are a valuable resource and because fish are used as indicators of ecosystem health. Thus, predicting effects on fish populations can be an important component of assessing environmental impacts of power facilities.

The RAMAS methodology allows users to build their own fish population risk model by specifying age-structured information on the survival and fecundity of fish populations. The model provides probabilistic estimates of the risk that populations will fall below specified thresholds, considering both natural and anthropogenic factors. The software, designed for use on an IBM PC-compatible computer,

transforms user input data through a Monte Carlo simulation to estimate expected population parameters and uncertainties for discrete age categories and entire fish populations.

RAMAS can be used to evaluate the potential effects new power facilities or changes at existing facilities will have on fish populations. Frequently, computer simulations can eliminate the need for lengthy and expensive field studies, and a wide range of scenarios can be efficiently analyzed.

Utilities have used RAMAS to assess such issues as selenium toxicity and power plant impingement and entrainment. The U.S. Environmental Protection Agency has used RAMAS to assess the effects of toxic substances on fish populations.

Duke Power Co. has proposed construction of a 2100-MW pumped-storage hydroelectric project on Coley Creek, a tributary of Lake Jocassee in South Carolina. Threadfin shad are an important food source for stocked trout in Lake Jocassee. As part of the licensing studies for the hydroelectric facility, the utility had to estimate quantitatively the potential entrainment impact on threadfin shad population levels.

The RAMAS model provided a convenient and appropriate analytical tool for evaluating the effect of pumped-storage operations on threadfin shad populations. Based on a range of possible operating scenarios, and using available estimates of shad population parameters from other studies, Duke used RAMAS to model the impacts of various levels of added mortality that could be caused by entrainment. Analysts also used RAMAS to compare these effects to expected year-to-year variations in natural recruitment and mortality. The results provided the required quantitative estimates of impacts on threadfin shad in a risk assessment format. A significant advantage is that RAMAS provides estimates of seasonal and year-to-year variability without requiring collection of extensive data, as traditional assessments based on field studies do.

The use of RAMAS saved over \$100,000 in labor that Duke power would otherwise have spent conducting field studies.

The evaluation of entrainment effects on threadfin shad populations was available six months sooner than it would have been if Duke had used field studies.

The RAMAS analysis is highly flexible, providing a means to readily evaluate alternative scenarios as other data became available, and as plant design or proposed operating schedules change, or to answer questions posed by regulatory agencies in their review of the licensing application.

Duke's application of RAMAS demonstrates the usefulness of this software to analyze the potential effects of hydroelectric facilities on fish populations.

Electric Power Research Institute-member utilities can order RAMAS, version 3.1, from the Electric Power Software Center, (214) 655-8883. Nonutility organizations should contact the Electric Power Research Institute Licensing Department, (415) 855-2866. The Electric Power Research Institute can be reached at Box 10412, Palo Alto, CA 94303.

Chevron Conservation Award Winners—1990

Chevron U.S.A. has announced the names and accomplishments of the 20 professional and citizen honorees and 5 nonprofit organizations that have been selected to receive 1990 Chevron Conservation Awards. Each honoree will receive \$1,000 and a bronze plaque.

In past years, few fisheries persons have been selected for this honor. It is, therefore, pleasing that three people have been chosen for the 1990 award, based on their fish-related activities. Most of the recipients this year are being honored for their efforts in environmental protection, restoration, and research for the benefit of flora, birds, and other fauna.

The ones receiving honors for their fish- and fishery-related efforts are:

August A. "Gus" Muench, Jr. of Ruskin, Florida. He led the effort to protect Cockroach Bay, the last productive natural fishery on Tampa Bay's eastern shore. He also created sea wall reefs, which turn vertical cement seawalls into productive habitats for fish, oysters, and other marine life.

Daniel G. Moriarty of Kilauea, Kauai, Hawaii. Mr. Moriarty led the largest restoration of an ecosystem in Hawaii when he re-established the native flora at Kilauea Point. A park ranger, he coordinated a 124-acre expansion of Kilauea National Wildlife Refuge to protect various species, including sea turtles, tropic birds, and monk seals.

Robert G. Boye of Edmonds, Washington. He has been instrumental in teaching 20,000 school children about water resources and ecology. He has assisted educators from nearly 60 elementary and middle schools through his classroom salmon enhancement project, which raises salmon in special aquariums and releases them in nearby streams.

It is hoped that the fisheries community will be more active in submitting applications so fish-oriented people will be well represented among future recipients of this prestigious award.

District News

NORTHWEST WASHINGTON

Donald McCaughran, *Director*

The March 22nd meeting of the Northwest Washington District featured three speakers who are directly associated with the current litigation proceedings involving tribal treaty claims to Puget Sound shellfish resources. Judith Freeman, assistant director of WDF, presented a historical perspective of the shellfish resources and their harvesting in Puget Sound. Judith contrasted mobile, "public" resources such as crab with intertidal (clams, oysters) "private" resources, indicating that the former are much easier to manage because they reside almost totally on public subtidal lands. Regarding the "private" resources, Judith described how approximately 80% of the Puget Sound beaches were sold to private owner-

cont. on page 4

District News cont.

ship in past years. Of the remaining 20%, about 10-15% are leased lands, closed due to pollution or urbanization, or generally inaccessible for public or tribal harvest.

Judith's presentation was followed by discussions of the legal views held by the state of Washington and the tribes. Mason Morisset (filling in for Phil Katzen), who has represented the tribes through several decades of the "Boldt" proceedings, presented the tribal view that their treaty rights guarantee to the tribes the right to ceremonial and subsistence (including commercial) harvest of shellfish on beaches not "staked and cultured" by non-treaty individuals. The tribes further contend that the state's sale of intertidal lands was largely illegal since they are in conflict with the tribal (federal) treaty rights.

On the state side, Narda Pierce, assistant attorney general for Washington, defended the right of the state to sell and manage intertidal lands and described steps being taken by the state to guarantee tribal rights—once they are interpreted by this third phase of the "Boldt" proceedings.

At the April 18 meeting, Arni Thomson, Executive Director of the Alaska Crab Coalition, spoke on trawl crab conflicts in the Bering Sea. Arni helped found the Alaska Crab Coalition, the largest Alaska crab group of its kind, in 1986 to further the goals of research, management, and conservation of king and tanner crab resources in the Bering Sea and the Gulf of Alaska.

Most of Arni's presentation focused on the history and management of trawl fishery conflicts with other demersal resources such as halibut and crab. Traditional conservation zones where trawling is prohibited or restricted are presently shrinking due to increased pressure from the trawl industry. The result is that by-catch impacts on crab (especially juvenile and female crab) are increasing as trawling moves into crab spawner/nursery areas and groundfish CPUE's decline (hence, increased effort for the same catches, resulting in more by-catch/unit catch), all at a time when *Opilio* crab are at record high levels and (some suspect) red king crab may be starting to show signs of significant juvenile recruitment to vastly depleted stocks.

Most present at the meeting seemed to agree that the domestic groundfish fleet is being overcapitalized and that the current problems in the Bering Sea will be substantially greater soon. Indeed, one guess is that the entire trawl fishery will be shut down in May of this year due to halibut by-catches alone! Perhaps the Russians may be looking for a few good ships.

In fairness, Arni mentioned that not all crab impacts are a result of the trawl industry. Arni pointed out that the crab fishery itself is responsible for some crab (and fish) mortalities due to gear handling stresses to juveniles and females (over 200,000 pot pulls in 1989), ghost fishing by lost gear, and handling stresses that can result in deadloss at the docks. The crab industry is currently working on these problems by modifying catch seasons (to minimize thermal stress to discards) and gear (to allow escape of crab from lost gear).

Our People

Donald A. Duff (AIFRB Member 1979) is working full-time for Trout Unlimited under a U.S. Forest Service/Trout Unlimited memorandum of understanding. Don, past American Fisheries Society Western Division president, is Regional Fisheries Ecologist for the Forest Service's Intermountain Region. His full-time assignment with Trout Unlimited will be funded jointly by the two organizations and will focus on encouraging and coordinating Trout Unlimited volunteer efforts on National Forest land. The assignment will last for at least 2 years.

Elizabeth Edwards (nee Elizabeth F. Vetter) (AIFRB Member 1987) of the LaJolla Laboratory and Bernard Megrey of the Alaska Fisheries Science Center have authored *Mathematical Analysis of Fish Stock Dynamics*, published by the American Fisheries Society. The book contains papers presented at the AFS MICROFISH Symposium held in 1985 and 1986. This valuable text represents a comprehensive cross-section of quantitative fisheries analyses for microcomputer use. It should prove extremely useful as a text for courses in fishery analyses and as a general reference to effective techniques for practicing fishery mathematicians faced with a variety of difficult real-world problems in fishery research and management.

Ted Hobson (AIFRB Fellow 1975) and Tony Chess of the Tiburon Laboratory's Groundfish Communities Investigations have received the outstanding Publication Award for their paper in *Fishery Bulletin*. The paper, *Tropic Relations of the Blue Rockfish, Sebastes mystinus, in a Coastal Upwelling System off Northern California*, explains how patterns of coastal oceanography influence trophic ecology of an important target of the recreational fishery.

Alec MacCall (AIFRB Member 1979), Acting Director of the Tiburon Laboratory of NMFS, authored a book published by Washington Sea Grant. The volume is titled *Dynamic Geography of Marine Fish Populations* and is based on a series of lectures presented at the University of Washington in the fall of 1986. It is the second volume in a new Washington Sea Grant series called *Books in Recruitment Fishery Oceanography*.

Foster Mayer, Jr. (AIFRB Member 1986) has been selected for the E47 "Exceptional Service Award". This award is identified with the American Society for Testing Materials Committee E47 on Biological Effects and Environmental Fate, and is presented to individuals for their outstanding contributions to the Committee's activities. Dr. Mayer is cited for his work in the development of standards and guidance documents in aquatic toxicology, work which has been significant and greatly appreciated. The Committee also acknowledges his continued scientific input and guidance in the development of these documents.

The award was presented on April 22 during the opening reception at the 14th Symposium on Aquatic Toxicology and Risk Assessment in San Francisco.

Stephen G. Rideout (AIFRB Associate Member 1977) is a candidate for the office of Second Vice-President of the American Fisheries Society. If elected, Stephen will take office at the AFS annual meeting in Pittsburgh, Pennsylvania in August, 1990. **Larry A. Nielsen** (AIFRB Fellow 1989) will assume the office of AFS president at that time, **Richard Gregory** (AIFRB Member 1972) will become president-elect, and **Carlos Fetterolf** (AIFRB Fellow 1983) will take office as first vice-president.

Jim Squire (AIFRB Fellow 1977) has added to his many honors by being selected 1988 NMFS Outstanding Employee of the Year in the professional category. The award carries a monetary compensation of \$1,500 and a plaque.

As a fishery biologist with the federal fisheries service for more than 35 years, Squire has been responsible for a remarkable number of memorable "firsts". His contributions have covered a wide range of activities from applications of new technologies to the solutions of fisheries problems through exploratory fishing and the beginning of new fisheries, to the support and promotion of marine conservation.

Jim was the first to map the distribution and abundance of northwestern Atlantic bluefin tuna. In 1956-1960, while with the Bureau of Commercial Fisheries out of Boston and Gloucester, he headed up exploratory longlining cruises aboard the research vessel *Delaware*, and charted tuna distribution along the edge of the Gulfstream from Florida to the Grand Banks. Up until Jim's *Delaware* work, nothing was known about western Atlantic tuna stocks, and there had been no records of bluefin along the North American coast.

Squire was also among the first fishery scientists to use underwater television for studies of trawl gear dynamics and was instrumental in the development of a towed vehicle for SCUBA divers to observe the reactions of fish to an approaching trawl net. Combining his interest in the use of aircraft for fisheries research (Squire is an experienced pilot, holding a commercial aircraft license), he initiated and experimented with the use of airborne infrared equipment to map sea surface temperature patterns. He was also the first biologist to establish an aerial fish spotter monitoring program for assessment of the abundance of pelagic school fish species off central and southern California. In recent years, he supervised the aerial fish monitoring program to acquire data from commercial aerial fish spotters and used this information to determine trends in apparent abundance for the major commercial and sport species off southern California.

Squire has led the effort to develop a research program for marine gamefish species in the eastern Pacific. In this connection he initiated and has conducted the Pacific International Billfish Angler Survey since 1970. His efforts have led to national and international recognition by sport fishermen, angler clubs and conservationists, and he is known world-wide as a source of information on billfish tagging and migration. In 1984, the National Coalition of Marine Conservation established an annual award in Squire's name to be given to the captain who tags and releases the most billfish off southern California, "in recognition of his continued sup-

port and promotion of marine conservation." Squire was honored in October 1989 by the Billfish Foundation of Miami, Florida, with their 1989 Conservation Award for Individual Scientific Achievement.

New Publications

Pacific Coast Inshore Fishes

Sea Challengers announces the third Edition, revised and updated, of their most popular book, *Pacific Coast Inshore Fishes*, by Daniel W. Gotshall (AIFRB Fellow 1978).

This revised and updated third edition includes descriptions and excellent color photographs of 167 species of fish that occur from Alaska to Baja California, as well as descriptions for 22 species that are not illustrated in the book. This edition contains the latest, up-to-date information on maximum sizes, geographic ranges, and depth ranges. This volume also has an expanded pictorial key to the families.

Pacific Coast Inshore Fishes has 98 pages, 7" x 9", and 175 color photographs. It sells for \$18.95 + \$2.35 shipping in quality paperback. Order from Sea Challengers, 4 Somerset Rise, Monterey, CA 93940.

Sea Challengers Book Catalogue

Sea Challengers, 4 Somerset Rise, Monterey, CA 93940-4112, has issued its Catalogue of Marine Life Books #8. This 32-page catalogue describes publications for sale—75 on marine fishes, 13 on freshwater fishes, 40 on aquatic invertebrates, 10 on marine mammals, and 19 on miscellaneous marine life topics. Also available are 5 sets of plastic underwater guide cards, 20 diving and snorkeling guides, 10 wall charts, and 4 sets of playing cards.

The books in this catalogue represent a very complete offering of publications on marine and freshwater biota. Not all of the items are published by Sea Challengers, but here is a huge array of publications, charts, and playing cards available in one place.

This catalogue is available from the publisher.

Decapod Names

The American Fisheries Society has published the second volume in its series of lists of names of aquatic invertebrates. *Common and Scientific Names of Aquatic Invertebrates from the United States and Canada: Decapod Crustaceans* was released in 1989 as AFS Special Publication 17. The authors are A. B. Williams, L. G. Abele, D. L. Felder, H. H. Hobbs, Jr., R. B. Manning, P. A. McLaughlan, and I. P. Farlante.

This comprehensive list includes the scientific names of over 1,600 species of shrimps, lobsters, crayfishes, and crabs; vernacular names are provided for many of these decapods. Compiled by the Committee on Names of Decapod Crustaceans of the Crustacean Society, this volume is the second in a series produced under the guidance of the AFS Committee on Names of Aquatic Invertebrates, whose charge it is to achieve uniformity and avoid confusion in vernacular nomenclature of aquatic invertebrates.

cont. on page 6

New Publications cont.

The book has 77 pages and 4 color plates, and is priced at \$14 for AFS Members and \$17 for non-members. Order from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199.

FDA Fish List

A Food and Drug Administration guide to acceptable market names for food fishes throughout the country is available. It was prepared in cooperation with the National Marine Fisheries Service.

"The Fish List" contains acceptable market, scientific, common, and regional names for nearly 1,100 species commonly sold in the U.S. For a copy, send \$2.75 in check for Order #017-012-00341-0, Government Printing Office, Washington, D.C. 20402, payable to Superintendent of Documents.

NAPAP Integrated Assessment Models

The National Acid Precipitation Assessment Program (NAPAP) has issued *Models Planned For Use In The NAPAP Integrated Assessment*. The book provides basic information about the mathematical models being used in the NAPAP Integrated Assessment. Particular attention is focused on the status of model development and evaluation to provide background information on the models being applied in the Integrated Assessment.

A major focus of NAPAP, as well as related programs conducted by non-federal organizations, has been the development of numerical models to enhance understanding of the acidification process and its effects. Models have been developed in several technical categories to assist in the (1) characterization of future emissions based on projected energy and economic activity, (2) simulation of atmospheric processes leading to wet and dry deposition of acidic substances, (3) characterization of the impacts of changes in deposition or air concentrations on aquatic and terrestrial systems, (4) characterization of biological effects on aquatic systems due to changes in water chemistry, and (5) evaluation of the costs of control strategies and the economic benefits of effects mitigation.

This document enables an overview of all relevant NAPAP models to be provided in a single report, but does not describe each model in detail. More detailed information on each of these models is provided in other NAPAP reports.

This book is available from National Acid Precipitation Assessment Program, Office of the Director, 722 Jackson Place, NW, Washington, D.C. 20503.

Acidic Deposition—Inventory of Projects

The National Acid Precipitation Assessment Program (NAPAP) published in January 1990 *Acidic Deposition: An Inventory of Non-Federal Research, Monitoring, and Assessment Information*, a huge volume which contains detailed information on approximately 700 scientific projects dealing with acid rain and associated air pollutants. The inventory was developed to assure that findings and data from state,

private sector, and other non-federal sources would be available for inclusion in NAPAP's assessment documents.

During the past 5 years, NAPAP's program of research has been divided among seven Task Groups dealing with: (1) Emissions and Controls, (2) Atmospheric Processes, (3) Atmospheric Transport and Deposition, (4) Atmospheric Deposition and Air Quality Monitoring, (5) Terrestrial Effects on Crops and Forests, (6) Aquatic Effects, and (7) Effects on Materials and Cultural Resources. In the development of the inventory, a total of 706 project summaries were returned from 81 individual sources. The returned materials represent a total of 262 projects from 25 states, and 444 individual project summaries from 56 private and non-government organizations.

This book is available from National Acid Precipitation Assessment Program, Office of the Director, 722 Jackson Place, NW, Washington, D.C. 20503.

Kemp's Ridley Sea Turtle Symposium

The 1985 symposium proceedings, *Proceedings of the First International Symposium on Kemp's Ridley Sea Turtle Biology, Conservation, and Management*, was published in 1989. The 260-page volume was edited by C. W. Caillouet, Jr. (AIFRB Fellow 1976) and A. M. Landry, Jr. (AIFRB Member 1977) and is available for \$20 from Texas Sea Grant, Texas A & M-Galveston, Box 1675, Galveston, Texas 77553-1675.

Kemp's ridley sea turtle (*Lepidochelys kempi*), the most critically endangered sea turtle species, is on the brink of extinction. Past human overexploitation of the eggs and turtles and current mortality due to incidental capture by shrimp trawlers are probably major causes of the demise of this species. Conservation and management of Kemp's ridley, which ranges from the Gulf of Mexico to U.S. and European Atlantic waters, depend on international cooperation. Kemp's ridley has only one known primary nesting beach, located near the Mexican village of Rancho Nuevo bordering the western Gulf of Mexico. Therefore the main focus of Kemp's ridley conservation and management has been protection of this beach during the nesting and hatching seasons to reduce the harvest and natural mortality of eggs and turtles.

This symposium covered the history and trends of Kemp's ridley conservation; current population status; public and private participation in conservation and management; hazards to and strandings of Kemp's ridley sea turtles; current research status and database management; captive breeding; and future perspectives.

Early Life History of Fish

The International Council for the Exploration of the Sea (ICES) has published *The Early Life History of Fish*, a compilation of 53 papers and 105 abstracts of papers and posters presented at the third ICES Symposium on the Early Life History of Fish held in Bergen, Norway in October 1988. J. H. S. Blaxter, J. S. Gamble, and H. V. Westernhagen are the editors of this 497-page volume.

The first two ICES symposia on this subject, held in Oban, Scotland in 1973 and Woods Hole, Massachusetts in 1979,

established early life history studies as a prime concern in fisheries research, and attested, by their size and scope, to the vast expansion of interest in this field. The proceedings of the third symposium illustrate the significant advances, trends, and concepts of recent years. This latest book covers the following principal topics: (1) spawning studies; (2) field investigations of distribution, transport, growth, feeding, late larvae, and juveniles; (3) recruitment; (4) experimental studies of feeding, growth, metabolism, predation, locomotion, osmoregulation, endocrines, and albinism; and (5) pollution studies. The material represents an international cross-section of views by scientists from 23 countries.

This volume is available from ICES, Palaegade 2-4, 1261 Copenhagen K. Denmark. The price is 460 Danish kroner plus postage.

Membership Report

PROMOTION TO FELLOW

Dr. Peter J. Eldridge	CA
Dr. Roger A. Rulifson	NC

PROMOTION TO MEMBER

Dr. Roman V. Jesien	MD
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NEW FELLOW

Marco L. Bianchi	WA
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Sammy M. Ray, *Membership Chairman*
Texas A&M University at Galveston
Building 3311, Fort Crockett
Galveston, Texas 77551

Direct membership inquiries to the Membership Chairman.

In Memoriam

Peter H. Oatis

AIFRB member 1980

February 15, 1990

Peter H. Oatis, Assistant Director of the Massachusetts Division of Fisheries and Wildlife, died tragically on February 15, 1990. Peter, who joined the Division in 1970 as an Aquatic Biologist, held a B.S. degree in fisheries from the University of Dayton (Ohio) (1966) and a Master of Science degree in Fisheries Biology from the University of Massachusetts (1970). He became Chief Aquatic Biologist in 1973, a position later transformed into Assistant Director for Fisheries. He was an active member of the American Fisheries Society and served as president of the Southeastern New England Chapter of AFS in 1977.

As leader of the state's fishery effort, Oatis was responsible for much of the exceptional fishing found in Massachusetts today and was not afraid of controversial programs. One of his first initiatives upon assuming responsibility for the state fishery program was a move to extend the fishing season year-round so that anglers might take advantage of good fishing conditions whenever the opportunity arose, and to spread out the intense fishing pressure associated with "opening day."

At the time of his death, Oatis, a man who Deputy Director Carl Prescott describes as a "visionary," was involved in developing a segmented management program for bass fisheries in warmwater lakes and ponds.

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BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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VOL. 19, NO. 4

AUGUST 1990

Hunter Wins Roger Revelle Award

Dr. John R. Hunter, immediate Past-President of AIFRB, has been chosen by the San Diego Ocean Foundation as the 1990 winner of the Roger Revelle Perpetual Award. John is a National Marine Fisheries Service scientist with the Southwest Fisheries Center in La Jolla, California.

John Hunter was honored for pioneering research on fishes of the San Diego area, and, in particular, for his work on captive spawning and rearing of white seabass, an important game and commercial fish in southern California.

Hunter has been the leader of the Center's Coastal Fisheries Resources Division for the past 2 years and is also adjunct professor with the Scripps Institution of Oceanography. In the latter capacity he advises doctoral students on thesis subjects relating to local fishery issues. He is also head advisor of the Center's National Research Council Committee, which promotes and supports post-doctoral fellowships at the Center.

Hunter was the chief advisor who helped lay the groundwork for refining techniques to rear the larvae of white seabass, a valued but declining sport fish, techniques which have since been applied to aquaculture work now being done at Hubbs Sea World.

In March 1982, under Hunter's direction, white seabass were spawned for the first time in captivity at the Southwest Fisheries Center. No one even knew what a white seabass egg or larva looked like before the experiment. The fish were induced to spawn under carefully controlled conditions, including the precise variation of day length with artificial light. Later, under Hunter's guidance, techniques for maintaining the growing white seabass larvae were also developed. Hunter provided facilities, support and technical advice to a graduate student from San Diego State University who developed important rearing techniques for white seabass in use today. The project and the brood stock fish were transferred to the Hubbs Sea World Research Institute in December 1984. Researchers at Hubbs Sea World use the bass for studies on rearing fish in captivity for release into the wild to enhance fishing.

Within the Center's Coastal Division, Hunter currently leads a team of biologists who study stocks of Pacific groundfishes such as Dover sole and sablefish, and coastal pelagic fishes like anchovy and sardine. They conduct research vessel surveys to measure the abundance of these fish stocks, and evaluate biological and environmental influences that affect

their survival. The Division also studies factors that affect the economics of fisheries that are supported by these fishes.

The award was presented to Hunter at the Foundation's annual fund-raising dinner ("Oceans '90") in San Diego on June 8.

Supersalmon

This could be the year of the first "supersalmon"—5-year-old chinooks that stayed in the Great Lakes last fall continued to get bigger instead of succumbing to the spawning urge. Michigan State University (MSU) researchers theorize that these fish, which are sexually sterile, have not developed reproductive glands and, therefore, had no interest in spawning—and thus, dying—with other 4-year-old chinooks last fall. The fish are expected to continue to grow to super sizes of 70 pounds or more and live to be 6 to 8 years old or older.

There are currently only about 1,000 of them out there, which makes the chances of catching one this summer "a little better than winning the state lottery," says Dr. Donald Garling, Associate Professor of fisheries and wildlife at MSU.

Garling and MSU colleague Dr. Howard Tanner, working with the Michigan Department of Natural Resources, started the experiment in the spring of 1986 by planting 25,000 sexually sterile chinooks in the Great Lakes. The following year, they added another 65,000 and in each succeeding year, about 90,000. The fish were made sterile by immersing eggs in warm water. The resulting chinooks were "triploids," meaning that they had three sets of chromosomes in each of their cells instead of the usual two (diploid).

Garling reports that there is good evidence that the experiment is working. Many triploid fish, which are identified by missing adipose fins, have been caught but none have shown any sexual development. The same is true for fish that have been at the hatcheries. Moreover, none of the fish caught going upstream last fall were triploids.

Unfortunately, fishing and normal hazards encountered by salmon have reduced the original 25,000 to about 1,000, Garling estimates. That makes the chances of catching a 5-year-old triploid about one in 100,000. "We will be lucky to see two or three caught this year," says Garling. "But the chances will keep getting better."

cont. on page 2

Supersalmon cont.

Garling and Tanner are anxious to make anglers aware of the research so that they will be on the lookout for a missing adipose fin and turn the heads of such fish over to the DNR. The snouts of these fish carry a very tiny, nearly undetectable tag that tells the researchers when and where the fish were released.

A problem might arise, says Garling, if a triploid beats out a diploid chinook in a fishing contest and the number two angler challenges the validity of the winner.

"We have talked about this to some of the fishing contest sponsors," says Garling, "and they have decided to rule that the triploids are legitimate chinooks."

From SFI Bulletin, April 1990

Invasion of San Francisco Bay by *Potamocorbula amurensis*—A Major Perturbation?

Continuing studies of the invasion of San Francisco Bay by the Asian bivalve *Potamocorbula amurensis* show that this clam is having a major effect on benthic and pelagic communities of the northern reach of the bay.

This clam was first discovered in Suisun Bay during October 1986. It spread rapidly throughout the Suisun and San Pablo Bay area and is now found nearly everywhere in the bay irrespective of salinity, water depth, and sediment type.

Long-term benthic sampling in Grizzly Bay by Department of Water Resources and Regional Effects Monitoring Program sampling nearby have provided an unusual opportunity to document the time course of this invasion. Data from these two programs reveal that benthic community dynamics in the Suisun Bay area have been dramatically altered since arrival of the Asian clam.

From 1977 through 1986, the macrobenthic community at the Grizzly Bay monitoring site varied predictably in response to river inflow. During years of normal or high streamflow, the community consisted of 3 to 6 brackish or freshwater species. During dry periods, the number of species doubled as such estuarine species as the soft-shell clam *Mya arenaria* were able to colonize areas farther up the estuary.

In June 1987, at the beginning of the present drought, large numbers ($>12,000/m^2$) of juvenile *P. amurensis* were discovered at the site. By mid-summer 1988, when the low-flow community should have become fully reestablished, the new clam was extremely abundant and typical estuarine species never appeared. Despite continuing low flows, both the number of species and total non-*Potamocorbula* individuals continued to decline through 1988, when, except for the occasional appearance of a few specimens of other species, only *P. amurensis* was found. This situation has continued through spring 1990.

P. amurensis is a suspension feeder that, in its present abundances, may be capable of consuming a major fraction of the phytoplankton produced in northern San Francisco Bay. Many years of data show that the Suisun Bay region of the estuary normally features a winter minimum and a summer maximum in both primary productivity and phytoplankton biomass. A study in 1988 showed an extreme departure from this norm: the annual rate of primary productivity was only $20 \text{ g C}/m^2/yr$, a rate lower than is found in many nutrient-poor environments, and chlorophyll *a* never exceeded $3 \text{ mg}/m^3$. Although maximum photosynthetic rates per unit of plant biomass were no different from those of previous years, the normal summer maxima in biomass and primary productivity never occurred.

Nutrients, abundant at all times, could not be considered limiting. As in previous years, productivity was highly correlated with biomass and available light. Therefore, the low primary productivity rate can only be explained if we assume phytoplankton biomass is being rapidly consumed. The most likely explanation is consumption by the newly introduced, benthic suspension-feeding clam.

This conclusion is being tested in the laboratory over a range of flow velocities in small test containers and a laboratory flume. Initial results show that filtration rates can vary from 100 to 700 L/g clam ash-free dry weight/day - rates that are sufficient to account for the reductions in phytoplankton biomass in northern San Francisco Bay during 1988.

Additional field and laboratory results show that the new clam may be having a major effect on the zooplankton communities of northern San Francisco Bay as well. Until 1977, the zooplankton community at intermediate salinities within the San Francisco Bay estuary was dominated by the copepod *Eurytemora affinis*. During 1977 to 1979, abundance of *Eurytemora* declined and an introduced copepod, *Sinocalanus doerri*, became established upstream of *Eurytemora*. In 1988, an introduced cladoceran, *Pseudodiaptomus forbesi*, became abundant, while *Eurytemora* abundance declined by about two orders of magnitude. Preliminary laboratory experiments showed that the clam consumed early life stages of *Eurytemora* but not of *Pseudodiaptomus* in numbers sufficient to explain the change in abundance, and that reproduction of *Eurytemora* was not food-limited. These results suggest that differential predation can be important in determining distribution and abundance of zooplankton species in the estuary.

It is apparent that successful establishment of *Potamocorbula* in San Francisco Bay—to the point it has displaced established benthic species, reduced phytoplankton biomass to extremely low levels, and altered zooplankton community dynamics—is cause for concern regarding the effect of these changes on beneficial uses of the estuary.

These findings raise some questions:

Is the dominance of *Potamocorbula* in Grizzly Bay indicative of its influence throughout the null/entrapment zone region?

Is the population increasing, stabilized, or decreasing with time?

Will its present distribution and abundance be limited by freshwater inflows; *i.e.*, reduced during periods of normal or high river inflows?

Given its present abundance, biomass, and growth rate, do its food requirements exceed available production in the Suisun Bay area?

To answer these questions, the U.S. Geological Survey began a benthic sampling program in May 1988 to augment the Department of Water Resources and Regional Effects sampling in the area. This new program includes monthly sampling of the benthic fauna at six sites in Suisun Bay and an additional site in the Sacramento River off Rio Vista, with methodology essentially the same as that used in the Regional Effects Monitoring Program.

One of the goals is to determine the rate at which soft tissue is added during growth in carbon units on an annual basis ($\text{g C/m}^2/\text{yr}$). Knowing the rate of *Potamocorbula* tissue growth will allow us to begin to quantify its contribution to the carbon budget of the null/entrapment zone and its potential importance as a food item for bottom-feeding fish and birds.

Another goal is to continue sampling until we have a year of "normal" streamflow to characterize *Potamocorbula* population dynamics over the full range of environmental conditions and, particularly, its response to a prolonged period of low salinity.

*F. H. Nichols in NEWSLETTER of the
Ecological Study Program for the
Sacramento-San Joaquin Estuary, June 1990*

Shrimp By-Catch

Red snapper in the Gulf of Mexico have been so severely overfished that catches should be cut drastically—up to 75% across the board, a special reef fish review panel told the Gulf Fishery Management Council at its April meeting. But because the by-catch of red snapper in the shrimp trawl fishery is so high and will probably remain unregulated for the foreseeable future, the scientists advised the Council that in order to rebuild the snapper population, the directed commercial and recreational fisheries would have to be closed down completely until the year 2000.

The federal Reef Fish Management Plan is emerging as the entry point for addressing the formidable problem of shrimp by-catch and the devastating impact it is having on other fisheries. The red snapper situation illustrates the dilemma for managers. An estimated 4.5 to 10.8 million pounds of red snapper (experts say the higher number is closer to the mark), primarily fish in their first year of life, are killed by Gulf shrimpers yearly.

The magnitude of the by-catch in shrimp trawls, which scoop up virtually everything in their paths, has been well known for years. The millions of red snapper killed are only a small fraction of the total finfish by-catch. But now, as fish populations decline and catches are regulated, the need to do something to reduce the by-catch is pressing. Not only

does indiscriminate trawling contribute significantly to the over-exploitation of fish stocks, it also limits the options of managers trying to rebuild them. If shrimping remains uncontrolled, other commercial and recreational fishermen will have to bear the entirety of the sacrifice for conservation.

Even if new federal laws requiring TEDs (devices to exclude turtles from shrimp nets) are complied with, it will only put a small dent in the problem. Most approved TEDs are designed to save large turtles, not juvenile fish. The model developed by NMFS can be rigged to reduce the catch of fish by 50 to 70%, but it's not widely used. Clearly, to solve the by-catch problem, the Councils and NMFS must initiate laws requiring all shrimpers to use trawling efficiency devices.

From NCMC Marine Bulletin, April/May 1990

No Net Loss

by Karl Blankenship

Forget "read my lips." The three most controversial words of the Bush Administration may well be "no net loss."

For the federal government, trying to develop a nationwide wetlands policy has proven as difficult—and controversial—as efforts in the Chesapeake Bay states.

Although President Bush supports a no net loss policy, no one has defined what that means. Efforts to clarify it, such as the recent Corps of Engineers-Environmental Protection Agency memorandum of agreement, have aroused anger from both environmentalists and developers.

Some clarification may come from a wetlands task force set up by the president's Domestic Policy Council. The task force's charge includes recommending how to implement a no-net-loss goal, and providing guidance so federal agencies—as well as state and local governments—all speak with one voice when talking about wetlands.

The task force expects to conduct six hearings across the country this summer. But it has already come under fire for moving slow. The task force is now on its second chairman, and is not expected to make recommendations by the end of the year as originally planned.

Yet clarification is anxiously awaited by developers and others who have long complained of dealing with complex—and sometimes conflicting—federal and state-level policies.

"I don't think anyone's defined what no-net-loss really means," said Lawrence R. Liebesman, a former wetlands attorney with EPA and the Justice Department who recently completed a guide on the subject for the National Association of Home Builders. "How does that apply to a case by case situation? Does it take into account only acreage, or does it include function?"

Developers are not the only ones to throw stones. A 1988 report by the U.S. General Accounting Office found significant differences between the Corps and other agencies regarding wetlands. One example: The Corps' Vicksburg Office

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No Net Loss cont.

determined that it allowed the loss of 800 acres of wetlands in 1986. The Fish and Wildlife Service estimated 55,000 acres were adversely affected.

Since then, the Corps, EPA, and others have agreed upon a common wetlands definition and produced a uniform delineation manual. And, to clarify the troublesome issue of mitigation—the replacement strategy needed to achieve no-net-loss—the Corps and EPA adopted a memorandum of agreement to give field staffs guidance about when and how to require mitigation.

Rather than resolving conflict, the agreement prompted it with a footnote which said, in part, that “avoidance, minimization, and compensatory mitigation may not be practicable where there is a high proportion of land which is wetlands.”

Environmental groups worry that wording could open loopholes in the future. But Greg Peck, chief of EPA’s wetlands enforcement and regulatory policy staff, said the footnote was intended to apply only to areas such as Alaska’s North Slope, where wetland tracts are so large that mitigation as defined under existing guidelines may not be practical.

“It (the footnote) may be interpreted differently by others,” Peck said, “but this provision must be consistent with the regulations. It was not included in the MOA to provide a loophole.”

Meanwhile, more than 60 pieces of legislation in Congress would impact wetlands, and many would weaken protections. One protection bill which has drawn significant support from conservation groups is the measure introduced by Rep. Bennett, the “Wetlands No Net Loss Act.” It would put into law the recommendations made by the National Wildlife Policy Forum which was organized by the Conservation Foundation when William K. Reilly was its president.

The Bush Administration has not yet taken any position on the bill—or, for that matter, whether a no-net-loss policy should be achieved through administration actions or legislation. Many do not expect action until the Domestic Policy Council makes recommendations.

Even when those decisions are made, another question looms: Can any no-net-loss policy offset huge wetland losses along the nation’s coasts caused by sea level rise and land subsidence?

In Louisiana, four acres of marshlands are lost each hour because of rising sea levels, lowered land levels, and other factors. The Blackwater National Wildlife Refuge in Maryland has lost 5,000 acres of wetlands in 40 years due to sea-level rise, land subsidence, or both. Huge tracts of land would be needed to mitigate such losses. If global warming brings faster sea level changes, the situation would get worse.

“Sea level rise is the big unknown,” said Robin O’Malley, who represents the President’s Council on Environmental Quality on the Domestic Policy Council’s wetlands task force. “If we have a significant sea level rise, we’ll have significant problems.”

From Chesapeake, May-June 1990

Fishery Professorship Vacancy

The University of Massachusetts is seeking candidates for the following teaching and research position:

Assistant Professor of Fisheries Science—Nine-month tenure track faculty position to begin January 1, 1991. Responsibilities include teaching graduate and undergraduate courses, graduate and undergraduate student advising, participation in extension activities, and providing leadership in a research program. A Ph.D. is required with expertise in population dynamics or population genetics, specializing in coastal fisheries issues. Demonstrated potential for excellence in teaching and research is essential. Cooperative research with state and federal natural resource agencies is desirable. Salary commensurate with experience and qualifications.

Send letter of intent, official transcripts, curriculum vitae, and three letters of reference to: Dr. Carl A. Carlozzi—Chair, Fisheries Science Search Committee, Department of Forestry and Wildlife Management, 204 Holdsworth Natural Resources Center, University of Massachusetts, Amherst, MA 01003, by November 9, 1990. Phone (413) 545-2665.

The University of Massachusetts is an Affirmative Action/Equal Opportunity Employer.

Want to Volunteer?

The U.S. Fish and Wildlife Service is accepting applications for volunteers at national fish hatcheries, national wildlife refuges, research stations, and offices.

Both skilled and unskilled volunteers are welcome, and no age limit applies. Anyone under 18 is encouraged to volunteer as part of a supervised group such as the Girl Scouts, Boy Scouts, or 4H Club.

To volunteer, contact managers of field stations or offices in your area.

Our People

Nancy Davis (AIFRB Associate Member 1984), fishery biologist, has received a Certificate of Recognition from the U.S. Department of Commerce for her assistance with species and stock identification of salmon illegally caught by Taiwanese fishermen.

John Halver (AIFRB Fellow 1971), fisheries research professor at the University of Washington College of Ocean and Fishery Sciences, has been named a Fellow of the American Institute of Nutrition.

Meetings Announcements and New Publications

Salmon Symposium

Western Division of the American Fisheries Society, Northeast Pacific, will sponsor a *Chinook and Coho Salmon Symposium*, with additional sponsorship by the Cooperative Fishery Unit at Humboldt State University, the Humboldt State University Fisheries Department, the Six Rivers National Forest, and the California Department of Fish and Game. The hosts for the symposium are the Humboldt Chapter and the California/Nevada Chapter of the American Fisheries Society. A companion workshop to the salmon symposium will be an *Estuary and Ocean Productivity Workshop*. The meetings will be held on September 18-22, 1990 at Humboldt State University, Arcata, California.

On the first day, a field trip is scheduled for the Six Rivers National Forest to view streamside chinook salmon spawning and rearing facilities and instream habitat restoration structures. On September 19, the symposium will consider a salmon fisheries management overview of major drainages and discuss Klamath River salmon management. A coho management get-together will also be held on that day. On the third day, the symposium will feature smolt quality and emigration cures; harvest management; and endangered salmon stocks. A banquet will be held that night. On September 21, the symposium will take up genetic and hatchery practices, and on the last day the productivity workshop will be held.

For registration information and a list of accommodations, contact Kerry Overton, Six Rivers National Forest, 507 F Street, Eureka, CA 95501.

Marine Habitat Restoration Symposium

The National Oceanic and Atmospheric Administration will sponsor a symposium on habitat restoration, *Restoring the Nation's Marine Environment* on September 25-26, 1990 in the Department of Commerce Auditorium, Washington, D.C.

The National Oceanic and Atmospheric Administration (NOAA), as steward of the nation's marine resources, has for many years monitored the health of our living marine resources and their habitats. Recently, NOAA has begun to pursue ground-breaking legal action against those accused of substantial damage to the natural resources of our environmentally sensitive coastal areas. Such action, under the Superfund, Clean Water and other federal laws, is aimed at restoring damaged resources.

But such action also requires resources of a different kind: scientists and researchers in the United States and abroad who are familiar with natural resource damage assessment and restoration.

NOAA invites you to attend its first-ever symposium on the restoration of marine natural resources, a field that is expected to become increasingly important in the '90s as state and federal agencies entrusted with protection of natural resources plan restoration of sensitive areas. NOAA has assembled an international panel of experts to exchange information on how best to restore our nation's damaged coastal areas and how to determine costs and benefits of such restoration.

On September 25-26, 1990, in the Department of Commerce Auditorium (14th Street and Constitution Ave., NW, Washington, DC) fifteen eminent scientists and researchers, experts in fields such as ecology, marine biology, fisheries biology, and physical and chemical oceanography, will present the latest available techniques and data being used to restore habitats. Among the topics that will be discussed are restoration of salt marshes, seagrasses, coral reefs, mangroves, and other critical ecosystems harmed by man's actions.

Because there is no registration fee for this symposium, space will be limited, and you are encouraged to send your name, address, affiliation, and telephone number to Ted Lillestolen, NOAA/NMFS Room 8268, 1335 East-West Highway, Silver Spring, MD 20910. (301) 427-2319. Mention the NOAA Symposium on Habitat Restoration. To those who respond, an expanded brochure with abstracts of presentations will be mailed.

Items on the program, after opening remarks and a keynote address by NOAA Administrator John Knauss, are: *What is the U.S. Government Doing to Restore Habitats*; *Restoring Salt Marshes in Southern California*; *Marsh Creation*; *Creating Temperate and Tropical Seagrasses*; *Restoring Polluted Seagrass Habitats*; *Restoring Pacific Coral Reefs*; *Managing the Restoration*

of Caribbean Mangrove Ecosystems; *Kelp Forest Restoration*; *Forestry's Impact on Salmon and Trout in Shallow, Rocky River Areas*; *Large River Anadromous Fishery Habitats and Hydroelectric Power Facilities*; *Restoring Urban Habitats around Puget Sound*; *Urban Eutrophication and Restoration of Disused Docks in Estuaries*; *Constructing Artificial Reefs in Estuaries*; *Habitat Recovery after the Torrey Canyon Oil Spill*; and *What Have We Learned, Where Are We Headed?*

World Fisheries Congress

The World Fisheries Congress, to be held on April 14-19, 1991 in Athens, Greece, will be a five-day global conference for the free exchange of scientific information within the natural resources community. The goals are to assess the state of the world's fisheries resources and to promote scientific collaboration.

Fisheries scientists worldwide are planning the Congress because of their shared concern about the long-term health and wise use of fisheries resources. Because neither fish nor water recognize political boundaries, a global forum is needed to adequately address the proper worldwide stewardship of fisheries resources.

Fisheries are undergoing important changes. The Twenty-first Century will bring increased reliance on aquatic habitats for food, employment, recreation, and ecological integrity. The degradation and loss of aquatic habitats today is jeopardizing many ecosystems. Increasing fishing pressure is depleting many important aquatic populations. The growing role of aquaculture in food-fish production is influencing the character of traditional fisheries resource management. Great disparity exists in available data and methodology, making accurate assessment of the world's fisheries resource difficult.

The World Fisheries Congress was created to consider these issues and related scientific and technical advances from a worldwide perspective. Although attention is focused on the five-day conference, the organizers intend for the Congress to be an initial step towards continuing international cooperation. In pursuit of sustained benefits from aquatic resources, we all must be part of a worldwide community of fisheries scientists and managers. Through the meeting, its resulting five-volume proceedings, and its network for scientific collaboration, the Congress will set the stage for the Twenty-first Century.

The themes for the Congress will be: Condition of major aquatic habitats; fisheries resource utilization and policy; protection of biotic diversity; international development projects; assessment methodologies and fisheries management; and the role of aquaculture in world fisheries.

For detailed information, write World Fisheries Congress, American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814, USA.

Artificial Habitat Conference

The *5th International Conference on Artificial Habitats for Fisheries* seeks to promote an international exchange of information on the enhancement of fishery resources, habitat, and fishing through the use of artificial habitats in the world's marine, estuarine, and freshwater ecosystems. The purpose of this first general announcement is to inform potential participants of the planned conference and solicit pertinent titles. The Conference will be on November 3-6, 1991 in Long Beach, California.

The Fourth International Conference was held in Miami, Florida, in 1987 and attracted 350 participants from 26 countries. It resulted in the substantial advancement of the science of artificial habitat development and management and identified many of the areas to be pursued in 1991. A much enlarged global network of interests has been forming lately.

We invite titles for papers relating to research, technological improvements, and management issues for the topics listed below.

Planning: Local, state, provincial, prefectural, regional and national perspectives. Needs, goals, and practices, including evaluation.

Function and Ecology: How artificial habitats fulfill life history requirements. Yield, production, etc. Reproduction, recruitment, residence of organisms.

Options for Designing Habitat Systems: Integration of biology with design, engineering, and material selection.

cont. on page 6

New Publications cont.

Mitigation and Restoration: The emerging issues of compensation, replacement, and valuation. Purposes, performance, and responsible application.

Monitoring and Assessment: Physical environmental, and economic evaluation.

Policy and Management: Ownership, use, conflict resolution, etc.

Artisanal Fishing: Systems and innovation.

Offshore Structures: Performance of large fabricated units, petroleum production platforms, etc.

All interested professionals are invited to submit titles for papers and/or ideas for special sessions for the *5th International Conference on Artificial Habitats for Fisheries*. A call for abstracts will follow in the fall of 1990. Selected papers will be presented by the author(s) at the conference in Long Beach, California, 3-6 November 1991. Papers will be presented in technical, special, and poster sessions and published after review.

An extensive exhibit of products and services related to artificial habitat technologies is planned as an integral part of the conference. Please plan accordingly.

For further information, please contact: Mr. Robert S. Grove, Conference Chair, c/o Section of Fishes, Natural History Museum, 900 Exposition Blvd., Los Angeles, CA 90007, USA. Phone: 213-744-3373. FAX 213-746-2999.

Contaminants and Fisheries

The Pollution Committee of the Southern Division of the American Fisheries Society will hold a contributed paper session on Sunday, October 21, 1990, in association with the 44th Annual Conference of the Southeastern Association of Fish and Wildlife Agencies in Richmond, Virginia. Papers included in this session will *not* be considered for publication in the *Proceedings* and will *not* require submission of a manuscript. The objective is to provide a forum for exchange of information on the effects of contaminants and waste quality on aquatic organisms in the southeastern U.S.

Presentations dealing with contaminant effects, monitoring and biomonitoring programs, water quality and fisheries relationships, resource damage assessments related to spills and/or fish kill investigations, and ecotoxicology are invited. To avoid competition with the primary Southeastern session, contributions should address research *not intended for publication in the Proceedings*. Presentations regarding ongoing research and monitoring programs intended for later publication elsewhere are considered appropriate.

Submissions should include title; full name, address, and telephone number of each author (speaker underlined); and abstract (not to exceed 300 words). Please identify the status of the senior author (student or non-student). Submit abstracts to George J. Guillen, Texas Water Commission, 815 Seafoam, Houston, Texas 77062.

Fishes of the Central United States

Joseph R. Tomelleri and Mark E. Eberle have written *Fishes of the Central United States*, a treatment of more than 100 fish species—some for the first time ever, some for the first time as male/female pairs, and juveniles. Included are all of the fishes likely to be caught on hook and line in the central United States (the area bounded by the Mississippi, the Rocky Mountain foothills, Canada, and southern Texas) along with representatives of most genera found in the region.

The text focuses on the ecology and natural history of each species. The book's species-by-species accounts are accurate but not technical, and are interwoven with folklore and anecdotes.

This book is available in bookstores or from the University Press of Kansas, 329 Carruth, Lawrence, Kansas 66045. The price is \$35.00 for cloth or \$17.95 for paperback (plus \$2.00 for shipping and handling when ordered directly from the publisher).

New Prentice Hall Books

Ecology and Evolution of Livebearing Fishes, edited by Gary K. Meffe and Franklin F. Snelson, Jr.

This source offers extensive coverage of the ecological and evolutionary aspects of the biology of poeciliid fish, representing a synthesis of research gathered from all over the world.

The reference focuses on systematics, ecology, Mendelian genetics, population genetics, mating behavior, reproduction, life history evolution, unisexuality, and conservation problems of the poeciliids. It clearly defines the gaps in current knowledge about the unique poeciliid family, mapping out a promising path of various future studies of this fish group.

Partial Contents: Origins and Relationships of Unisexual Poeciliids; Sexual Selection and Secondary Sexual Differentiation; Life History Patterns; Ecological Genetics of Life History Traits; Phenotypic Plasticity in Poeciliid Life Histories; Allozymic Studies of genetic Variation in Poeciliid Fishes; Demographic, Spatial, and Temporal Genetic Variation in *Gambusia*; The Evolutionary Ecology of *Poecilia Formosa* and its Triploid Associate; Status and Conservation of Poeciliid Fishes. 453 pages. \$55.40.

Aquaculture: Volumes 1 and 2, edited by Gilbert Barnabe (Translated from the French by J.F. de L.G. Solbe).

This study of all aspects of aquaculture in sea and fresh water details the various categories of seaweeds, mollusks, shellfish, and fish. The reference presents current state-of-the-art reference material on scientific and economic data vital to the study and research of main species reared or cultured in fresh and sea water environments.

Each contributing author is a specialist in his own field. They take you through a broad spectrum of the latest aquaculture techniques, including an in-depth discussion of the improved synthesis of water treatment using novel procedures.

This two-volume reference also goes behind the scenes to spotlight exactly what's going on in different parts of the world. For example, **Volume 1** examines the oyster cultures in France, the scallop cultures in Brittany, and the open sea culture of mollusks in the Mediterranean. **Volume 2** discusses the economic impact of aquaculture in the Third World, why aquaculture techniques vary from country to country in this region, and how these countries are faring in their goal to use aquaculture as a source of food.

Aquaculture: Volumes 1 and 2, will surely go a long way in improving efforts to apply the newest and best techniques in the specialized fields of water biotechnology, waste water management, biology, marine water quality, and ecology.

Contents—Vol. 1: Water—The Medium for Culture; Water Supply, Treatment and Recycling in Aquaculture; Culture of Micro-Algae; Harvesting of Micro-Algae; Rotifers—Biology: The Use of *Artemia*; Harvesting Zooplankton; Controlled Reproduction of Bivalve Mollusks; Traditional Oyster Culture in France; Clam Culture Scallop in Brittany; Open Sea Culture of Mollusks in the Mediterranean; Culture of Echinoderms. 478 pages. \$105.95.

Contents—Vol. 2: Panaeid Prawns; Freshwater Prawns; Culture in Salmonids in Fresh Water; Fish Culture in Ponds; Sea Water Culture of Salmonids; Rearing Bass and Gilthead Bream; Sole and Turbot Culture; Sturgeon Farming; Eels and Eel Farming; Aquaculture in Marshes; the Salt Marshes of the French Atlantic Coast; Aquaculture in Heated Water; Larval Rearing in Extensive Conditions; Culturing *Tilapia* in Sea Water in Martinique; Culture of Aquarium Fish; Aquaculture in Japan; Aquaculture in China; Aquaculture in India; Aquaculture in the United States; Aquaculture in Africa; Aquaculture in Europe; Aquaculture in Ecuador. 556 pages. \$105.95.

These books can be ordered from Prentice Hall, Book Distribution Center, 110 Brookhill Drive, West Nyack, New York 10995-9901.

Atlas of Dangerous Marine Animals

Bruce W. Halstead, Paul S. Auerbach, and Dorman R. Campbell have authored a 192-page book entitled *A Colour Atlas of Dangerous Marine Animals*. Published by CRC Press, Inc. and selling for \$59.95 (\$70 outside the U.S.), this volume features the biology, habitat, and unique characteristics of each species, geographic location, and prevention and treatment of injuries from each animal.

The marine world harbors many attractive creatures that can sometimes lure the unwary into danger. This dramatic, full color book provides a complete photographic survey of the world's many dangerous marine animals. Closeups and cross-sections of the venom apparatuses of many animals are also included. This book will provide a useful reference source for marine biologists, oceanographers, marine scientists, toxicologists, as well as

accident, emergency, and trauma specialists. Its exciting photographs will enthrall anyone intrigued by the sea.

The contents include chapters on traumatogenic animals, venomous invertebrates, venomous vertebrates, invertebrates that are poisonous to eat, vertebrates that are poisonous to eat, electrogenic animals, advanced medical treatment, and a bibliography and index.

The book is available from CRC Press, Inc., 2000 Corporate Blvd. N.W., Boca Raton, Florida 33431.

Organic Chemical Toxicities—Vol V

The Center for Lake Superior Environmental Studies of the University of Wisconsin-Superior announces the publication of *Acute Toxicities of Organic Chemicals to Fathead Minnows* (*Pimephales promelas*), Vol. V.

The inventory of chemical substances and mixtures has been reported to consist of approximately 70,000 entities. While a hazard assessment of these chemicals is essential, the inventory is too large to test each chemical individually.

Within the last few years, attention has focused upon predictive toxicology for screening chemicals regarding their potential hazard to the environment. Due to the value of using structure-activity relationships to estimate aquatic toxicity, strong needs have developed for consistent and accurate data bases.

"Acute Toxicities of Organic Chemicals to Fathead Minnows *Pimephales promelas*", Vol. V contains original test data for an additional 103 chemicals (Vol. I contains test data for 174, Vol. II for 115, Vol. III for 136, and Vol. IV for 125 organic chemicals) using a single test species. This data has been generated during the past twelve years, with tests performed in water of uniform chemical characteristics.

This fifth book in a continuing series contains test results for chemicals which exert their toxic effects by various modes of action. Known modes of action include narcosis, inhibition of acetylcholinesterase activity, and uncoupling of oxidative phosphorylation.

Included are: Test chemical name and commercial source; molecular formula and weight; chemical purity; method of chemical analysis and measured concentrations for each treatment over a 96-hr exposure; test temperature; dissolved oxygen, hardness, alkalinity, and pH values for all treatments plus the control; length, weight, and loading factors for test organisms; 96-hr mortality (LC50) and effect (EC50) values; graphical depictions of the mortality and effect data in relationship to duration of exposure; and detailed behavioral observations of the test organisms during the exposures.

The book can be ordered for \$65 from CLSES Book Orders, Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, Wisconsin 54880-2898.

Submerged Aquatic Vegetation Guide

Field Guide to Submerged Aquatic Vegetation of the Chesapeake Bay is a new, free publication written by Linda M. Hurley of the Chesapeake Bay Estuary Program of the U.S. Fish and Wildlife Service.

Some call it underwater grass, some mistakenly call it seaweed. Some even call it SAV. But call it what you will, submerged aquatic vegetation is important to the health of the Chesapeake Bay, so the U.S. Fish and Wildlife Service has produced this guide to help citizens and resource managers identify the dozen or so species of SAV in the bay.

Produced in cooperation with the U.S. Army Corps of Engineers and Maryland Department of Natural Resources, the booklet describes the biology and importance of each plant and is illustrated with color photographs and drawings of all SAV species found in the estuary.

SAV has declined 65 percent in the bay. This book will help resource managers identify and protect what is left. It will also be used by citizens who participate in the annual "SAV Hunt" sponsored by the Service and the Chesapeake Bay Foundation to help verify the location of SAV beds mapped by aerial photography.

For single copies, write: U.S. Fish and Wildlife Service, Chesapeake Bay Estuary Program (Attn: Linda Hurley), 900 Bestgate road, Suite 401, Annapolis, MD 21401.

Paddlefish Film

"Ancient Survivors of the Missouri" is a 20-minute film about two of the largest, oldest, and most primitive freshwater fishes of North America—

paddlefish and pallid sturgeons. Their last and greatest stronghold is the Missouri River, but the river is not what it once was; dams and channelization have altered over 1,500 miles, inundating or cutting off spawning habitat from Missouri to Montana.

Although a fossil paddlefish seen in the movie would indicate that the species has successfully weathered the perils of more than 50 million years, paddlefish today maintain their population through natural reproduction only in Montana. The more rare pallid sturgeon may not be doing that well.

The film introduces both species, briefly reviews the history of the river's alterations, and follows along as federal and state biologists net for paddlefish, pallid sturgeons, or the more common shovelnose sturgeon in Nebraska and North Dakota. Fishery biologist Kim Graham of Missouri talks about the loss of paddlefish spawning in the lower Missouri basin, including the Osage River, and about his state's pioneering propagation efforts.

South Dakota fishery biologist Dennis Unkenholz describes the effects which the upper Missouri dams have had on paddlefish spawning. Propagation efforts in South Dakota are shown. Biologists remove eggs and sperm from paddlefish captured on Lake Francis Case near Chamberlain and hatch paddlefish fry at Gavins Point National Fish Hatchery.

South Dakota reservoir biologist Jim Riis describes the search for pallid sturgeons. In 1989, only ten pallid sturgeons were observed throughout its range, and the fish is being classified an endangered species in 1990. The only pallid sturgeon in captivity, at the Ak-Sar-Ben Aquarium in Nebraska, is shown. So are shovelnose sturgeon fry, which biologists artificially spawned and hatched in order to test techniques they hope to use on pallid sturgeons—if and when a pair of fertile pallids is found.

Paddlefish sports fisheries are shown at the renowned Intake fishing area on the Yellowstone River near Glendive, Montana, and below Gavins Point Dam on the Nebraska-South Dakota border. An interview with Bob Lumadue, a federal enforcement officer in Missouri, details the growing threat of the caviar trade to paddlefish.

Dr. Robert White of the Cooperative Fishery Research Unit at Montana State University explains why the undammed portion of the Missouri and its largest tributary, the Yellowstone, in Montana offer the greatest chance for the long-term survival of these species.

"Ancient Survivors of the Missouri" will interest student, professional, and general adult audiences. In classrooms it will be useful to teachers of science, biology, ecology, environmental studies, fishery science and management, geography, and regional studies.

This film can be ordered from Cottonwood Productions, Box 476, Wakonda, SD 57073. Price for 16 mm—\$250; ¼-inch or BETA—\$125; VHS—\$90. Rental of 16 mm is \$35.

Membership Report

PROMOTION TO FELLOW

Dr. Ronald G. Garton
Dr. David G. Hankin
Dr. John L. Fryer
Dr. John S. Rohovec
Dr. Robert T. Lackey
Dr. Gary A. Chapman
Dr. Richard A. Tubb
Dr. R. John Gibson
Dr. Richard G. Dudley
Dr. Glenn Cada
Dr. John P. Harville
Frederick W. Kircheis

ASSOCIATES

OR Sylvia L. Feldman PA
CA Russell W. Brown MI
OR Robert E. Elliott Ont.
OR Timothy D. Stecko PA
OR Jeffrey W. Tupen WA
OR Thomas J. LoVullo PA
OR Martin J. Gutowski PA
Newfoundland Laura R. White PA
OR David A. Sterritt AK
TN Constance J. Ryan CA
AK
ME EMERITUS

PROMOTION TO MEMBER

George G. Fleener MO
Richard L. Major WA
Thomas Jagielo WA
Dr. G. H. Lawler MB
Dr. Dennis R. Lassuy OR Dr. James Kirkwood FL

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Membership Report cont.

PROMOTION TO MEMBER

Dr. Antonio Amandi
Dr. J. Michael Redding
Robert R. Vreeland

OR
TN
OR

EMERITUS

Frank T. Carlson VA
Dr. Richard B. Thompson TN
Dr. Leonard Durham FL
William S. Davis VA

NEW MEMBERS

Dr. Mark R. Collins SC
Dr. Cheng-i Wen FL

Sammy M. Ray, Membership Chairman
Texas A&M University at Galveston
Building 3311, Fort Crockett
Galveston, Texas 77551

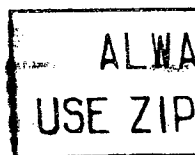
Direct membership inquiries to the Membership Chairman.

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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Participants in the 1990 AIFRB Board of Control meeting in Pittsburgh, PA. Jack Helle, President-Elect; John Merriner, Production Editor; Ed Ueber, Director, Northern California District; Bill Wilson, Director, Northern Alaska District; Sammy Ray, Membership Chairman; Joseph Rachlin, Treasurer; Oliver Cope, BRIEFS Editor; and Roy Nakatani, Secretary.

Our 1990 Board of Control Meeting

The 1990 AIFRB Board of Control meeting was called to order at 8:30 a.m., August 25, at the Pittsburgh Hilton in Pittsburgh, Pennsylvania. In the absence of President Charles F. Cole, who was involved in surgery at that time, President-Elect Jack Helle presided over the proceedings. Officers, members, and observers present during the 2-day session were: Jack Helle, President-Elect; Roy E. Nakatani, Secretary; Joseph W. Rachlin, Treasurer and New York-New Jersey District Director; Sammy M. Ray, Membership Chairman and Texas District Director; Oliver B. Cope, BRIEFS Editor; John V. Merriner, Production Editor; Bernard E. Skud, Past-President; William J. Wilson, Northern Alaska District Director; Edward Ueber, Northern

California District Director; Kirk T. Beiningen, Oregon-Southwest Washington District; Randy E. Bailey, Northern Alaska District; Gary T. Sakagawa, Southern California District; Richard A. Tubb, Oregon-Southwest Washington District; and Paul Brouha, American Fisheries Society.

A quorum was declared to be present, the agenda was approved, and the meeting proceeded.

Secretary Nakatani presented the minutes of the 1989 Board of Control meeting; the minutes were approved.

President's Report

The report of President Cole was distributed to those present; a condensation of the President's message follows:

As my presidency closes, I would like to provide our new president, Jack Helle, and members on the Board of Control

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President's Report cont.

with some personal perspectives on problems I see within AIFRB as well as some within the fisheries profession, and finally make comments on what AIFRB's role might be in shaping a change for the future. Little on my list will be new; anyone attending recent meetings of the Board of Control will recognize AIFRB's recurring problems which include but are not limited to: our identity crisis with AFS; changing professional requirements within our field; an ageing AIFRB membership; and how to re-invigorate our current membership while providing them something "useful" for their dues.

AIFRB and AFS

I have no solution for enhancing our image within the pool of fisheries professionals from which both societies gain members. We continue to be the only body evaluating life-long service and honoring that service with changes in rankings. AFS, on the other hand, provides many of our major referred journals and one feels somewhat "out of it" unless an AIFRB member is not also a member of AFS. Nowhere is that more true than in middle America where AIFRB is virtually an unknown. Even where we are known, we are viewed as "elitist" unless one's credentials are found acceptable for Member or Fellow status. Finally, we are so financially weak that it is difficult to create a national impact even at the annual AFS meetings. All this seems unlikely to change. Although I advocated a plan of national outreach, it has been less than successful, and we need to rebuild and revitalize by returning our attention to our membership from California north to Alaska. If we lose that power base, we will have lost everything.

Changes in Education

AIFRB is based on a strong commitment to higher education in fisheries. For the past 10 years, a national effort has been underway to change and raise the quality of higher education; AIFRB must become involved in the process. Above all, education is intended to liberate the mind from the shackles of the past and free it to consider and then make appropriate changes for the future. Unfortunately, in practice, the system too often venerates the past and fails to equip for making change. I see a number of changes necessary within the field of fisheries education, and AIFRB must influence those changes. Interestingly, many of these are needed across the full set of natural resources curricula—fisheries, wildlife, forestry, and range, among others.

The Pittsburgh symposium will have raised some of the educational issues and changes before AIFRB and AFS but our approach to the entire field remains incomplete. AFS and AIFRB need to think carefully about what it is they expect from the university's share of educational process. The Education Section of AFS has been fully involved in this process for several years and it is incumbent upon the membership of AIFRB also to be active in this process; whatever happens will result in curricular changes that AIFRB must consider when we evaluate our applicants. We must hear and consider reasoned advice from professionals in the field.

Teaching Old Dogs New Tricks

I often wonder what has happened to fisheries science—it used to be primarily biological—now it is far less so. Is it possible that my own biological bias has finally been broken to reveal what has always been there? I now see that we have not been equipping our future resource managers with sufficient economics, sociology, political sciences, or the decision-making skills they need in addition to a firm biological background. Our graduates who survived, learned on the job while defending agency policy at their first sportmen's club meeting. Our problem now is how to provide our graduates with a sound understanding of biology while at the same time providing the liberalizing education needed to cope when social values change. The need to understand complex societal issues and to be able to evaluate, appreciate, and resolve differences in points of view is a far cry from our earlier requirements that a graduating senior in fisheries know how to understand length-weight relationships and how to stock rainbow trout. Further, we need to recognize that similar problems are affecting each of the resource management fields.

Until very recently, each resource field has been closely identified with its user clientele group—hunters, fishermen, loggers, etc. Now our natural resource educational programs are suffering from such past stereotypes when we are perceived as being consumer-driven. This image aligns members of our professions against the non-consumptive user, who now appears to have greater political impact than the hunter and fisherman, and impact on environmental issues is international in scope. The widespread awareness of the need to conserve has only been enhanced with the general population's awareness that we are surrounded by actual or potential ecological disasters.

A number of universities are changing their programs. At Ohio State we decided to integrate the education of fisheries students with those in wildlife, forestry, parks and recreation, environmental education, and natural resources development. We are trying to develop in students an ability to work across perceived barriers between fields while not destroying the professions. We have struggled for the past four years to create an integrated core of courses in natural resources management into which will be interspersed sufficient specialty courses to prepare a graduate for the 40-some years in that person's professional career while at the same time providing qualifications for admission to someone else's graduate program. And we must not forget liberal education!

An added frustration has been the need to get faculty themselves to look across these barriers. Our program may well fail because of an inability to teach old faculty new tricks. We must get resource faculty to look deeply enough into the common elements of our disciplines so that we can discern what it is that we want taught. Our intent is not to blur the lines between the two fields but only to point out that many disparate biological phenomena are governed by common biological, social, and economic considerations.

If we are to revitalize the way in which we educate our future resource managers, it will be largely up to those of

us who are the "old dogs". On most campuses, new directions come from the old hands.

Why do middle and upper managers in state and federal agencies expect our 22-year-old graduates to have learned in four years of college everything they will ever need within the agency until time of retirement? Few agencies seem willing to accept any responsibility for providing intermediate or continuing education as their people move upward. A course such as "Public Budgeting and Spending Decisions" needs to be taught to someone between the ages of 35 to 40 at a time in their career when they can use it; for the 20-year-old, learning the fishes of Ohio is far more important. Agencies need to realize that there is a limit as to how much can be packed into a four-year education for the BS, or even into six years. How should agencies meet these further educational needs, and who pays for it? The question needs addressing by AFS, AIFRB, and the International Association of Fish and Game Agencies.

How is AIFRB involved in this problem? Many of us rising to the rank of Fellow have found ourselves administering research programs and, when we do, often find ourselves equipped with little beyond our own common sense in meeting the challenges of the new task. I am satisfied that AIFRB has correctly recognized this progression of responsibilities and has dealt with it fairly during our evaluation of Members requesting Fellow status. My concern is rather more with the agencies and their need to address the issue of continuing and broadening education and then to provide it to their staff.

Who Speaks for the Environment?

Another "educational dilemma" for me has been the rise of environmentalism on our campus. Here we have more than seventy scientists from fifteen different departments who are broadly interested in habitat, ecology, ecosystems, and their interactions with the problems of city growth, production agriculture, landfills, and water requirements. Somewhere in this group, the fish and wildlife faculty relinquished their role as the primary spokespersons for environmental quality. Is this part of a new national or even international direction?

We are in danger of being caught between being irrelevant to students interested in broader, non-consumptive conservation issues and a somewhat archaic tie to clients who may now be less important to us. I believe that professional schools training foresters and fish and wildlife specialists must become more responsive to environmental issues that are not driven by paradigms of the past such as "increasing the bag", "maximizing board feet" or "sustainable yield". In that regard, both AFS and AIFRB may be ahead of the educators; clearly society is bringing to us a new paradigm which may either be environmentalism or some broadened version of wise management of ecosystems. Either one may have in fact become more pertinent than our concern about fish and wildlife research.

And what about aquaculture? Although AFS has had a Fish Culture Section for some years and AIFRB favors aquaculture, many aquaculture researchers find neither organization professionally relevant. AIFRB doubtless has many who have moved around from fresh to salt, back to fresh, and finally even into aquaculture. Aquacultural

education has in the recent past been closely linked to fisheries management or fisheries biology programs in universities but, as practiced, aquaculture has far less to do with learning the biology of fishes than it does with raising a crop that can be sold profitably—it just happens to take place in water rather than soil. Unless university aquaculture programs evolve rapidly and are provided with new faculty, the management of fish farms may well be viewed in Colleges of Agriculture as being so similar to dry farming that the research supporting them will be relocated into Departments of Agricultural Economics where farm management is taught. I find most of the current constraints to the development of coolwater aquaculture in the midwest to be non-biological in nature. Farmers need help in developing aquaculture business plans, in developing effective and reliable ground-water supplies, in meeting the needs for formulation and marketing of feeds out of already available grains, and in the resolving of political, economic, and interstate shipping barriers to market growth. That does not say we should not also be conducting biotechnological and nutritional research but currently they have a lower priority in terms of getting things started. Biologists must understand this, but their own research bias gets in the way. How can AIFRB help in this educational process?

First, AIFRB's own management is returning with the Helle presidency to a region of strong membership strength, in the Northwest and in Alaska. We have wrestled for years with the dilemma of whether or not AIFRB should become some form of a wholly separated subsidiary of AFS. That will never occur because too many members of AIFRB have joined it because they disagreed with certain AFS policies. For us to simply merge, for them at least, is not possible. As a result, there will remain an uneasy tension between AIFRB and AFS that both groups must live with and respect. I see no alternative but for us to simply continue on the course set 34 years ago and rebuild ourselves by emphasizing for a time our northwestern origins.

Perhaps a revitalization can come most easily from AIFRB's center of membership concentration in the northwest. Certainly our efforts to grow in New England, the Washington District, in the Miami area, or in the midwest have not succeeded. Here, the problem is even worse when no more than fifty percent of the members of chapters of AFS Chapters even belong to the parent AFS. If national AFS means so little and if AIFRB as an organization is unknown except on a few campuses, how can we be expected to grow?

To summarize some of the challenges facing Jack Helle and others in the future: our field is itself changing and many of us are too narrowly trained as biologists—we need to attend to the future of the field. Increasingly, management decisions will be made more frequently on non-biological, perhaps economic, research, and will be based more often on value systems that we as biologists can neither accept nor even understand. As the field changes, unless we lead the changes, we will be perceived, and rightly so, as unreconstructed millstones to be ignored not only in the Dean's Office but also by the public at large and by the Legislature. Failure to anticipate and prepare for these changes will make it all

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President's Report cont.

the harder for this organization to attract new associates and keep them professionally active. We are truly a strange group, operating as we do without even an annual meeting of members. In describing us to others, I find myself apologizing when I tell them that only the Board meets and even they do it concurrently with AFS, even though we are not part of it. They puzzle over that as if we must be some tolerated but misunderstood country cousin. Finally, may I speak for the membership at large—and we in the midwest are truly *at large*—there is little opportunity to meet with others in AIFRB except when serving on the Board. Only if your District happens to be in the northwest will you have grounds to disagree.

Good luck, Jack. To those who have done many things without complaint over the last two years, thank you all!

Treasurer's Report

Treasurer Rachlin furnished copies of his financial report on AIFRB funds. This report is seen in a separate article in this issue of BRIEFS.

An audit of AIFRB checkbooks for the fiscal year was made by the officers and members present; the records were deemed to be accurate and proper, and their approval was voted. A vote on authorization for the Treasurer to sign checks and transact business for AIFRB in the coming year was carried.

Delinquency of membership dues was reviewed, and the Treasurer recommended the removal from the roles of 22 members who have not paid dues since 1988 (3 years). The vote on removal of these members was carried.

The current membership of AIFRB is 1,080, with 140 delinquent members, 185 emeritus members, and 755 paid members.

Report on Publications

BRIEFS Editor Cope reported as follows:

This report covers the publication of six issues of BRIEFS from October 1989 to August 1990—Volume 18, Numbers 5 & 6 and Volume 19, Numbers 1 through 4. Each issue had eight pages, and eight half-tone illustrations were run during the year.

BRIEFS was composed of the same general kinds of material used in the past few years, but had greater emphasis on the use of articles reprinted from other publications, less use of original items (because few were offered by the membership), and the use of only three thesis and dissertation abstracts. As in the past, I gave high priority to items dealing with AIFRB and AIFRB people. We printed very little about District activities because only one District, the Northwest Washington District, regularly contributed reports; most Districts did not send *anything* to the Editor this year.

Announcements, notices, and other items for consideration for publication were received from widespread parts of the country. From New England came 31 submissions; the Mid-Atlantic area (with strong representation from the

Washington, D.C. area) offered 77; from the South we received 31 items; the Mid-West sent 34; the West transmitted 29; Canada submitted 2 and 1 came from elsewhere. AIFRB leaders forwarded items in the following numbers: Cope-8; Ray-5; Rachlin-4; Nakatani-4; Merriner-24; and Skud-3. Universities sent copies of theses and dissertations as follows: University of Washington-1; City University of New York-1; Virginia Tech-1; Humboldt State University-3; Oregon State University-1; University of Manitoba-1; and San Diego State University-1. Of the materials sent from AIFRB leaders, Districts, and various sources elsewhere, 31.9% were published in BRIEFS.

John Merriner did a splendid job in distributing BRIEFS to the membership.

Discussions on the content of BRIEFS focused on the printing of abstracts of graduate degree theses and dissertations. The consensus was that abstracts of master's and doctor's theses and dissertations are useful to the membership and that BRIEFS should devote more space to these items. In addition, those present agreed that AIFRB should publish an annual list of master's degree titles on fishery subjects.

Production Editor Merriner reported on his experience during the past year in processing BRIEFS issues as they were received from the printer, Coastal Press of Morehead City, NC. John was able to label and mail the six issues in a timely fashion, so members received their copies during the month of publication. No problems in distribution were reported.

Requests for copies of AIFRB's old-growth symposium proceedings are occasionally received in Merriner's office. Since the stock of these books is depleted, there is a need for extra copies. Anyone with duplicate copies should send them to John Merriner for filling of requests.

During the meeting there was discussion of the printing of a new AIFRB membership directory, and those present voted to proceed with preparation of a new version. It is desired to include telephone numbers in the revised directory, and each member is urged to transmit his telephone number to the Treasurer, Dr. Joseph Rachlin, Department of Biological Sciences, Lehman College, Bedford Park Boulevard West, Bronx, New York 10468-1589.

Membership Report

Membership Chairman Ray furnished a detailed report on the 1989-1990 operations of the AIFRB Membership Committee. During this year the Committee processed 26 new applications for membership. All applications, including 18 for Associates, 7 for Members, and 1 for a Fellow, were approved. Of the applicants, 12 were nominated by members, 7 sent curricula vitae with initial correspondence, 5 sent applications with initial correspondence, and 2 wrote letters of inquiry.

The new membership represented the following areas of employment: 4% from foreign affiliations, 19% from the federal government, 19% from state governments, 8% from private industry, 8% from university employment, and 38% from graduate students. Areas in which the new members live are: Alaska and Western Canada-2; Northwestern States-5; Southwestern States and Western Mexico-3; Central States and Middle Canada-2; Northwestern States

and Eastern Canada-7; and Southeastern States and Eastern Mexico-7.

Promotions were considered for 34 people; 2 were denied and 3 were undecided and presented to the Board of Control for rulings. Fourteen persons were granted Emeritus status during the year.

The composition of the Membership Committee must change this year. A new Membership Chairman is to be named, and two new members will be needed. The new leadership in AIFRB will attend to this matter, and has already welcomed Dr. Joan Browder of Florida to the ranks of the Committee. The Board approved the names of five members as possible Membership Committee members.

Awards

Small numbers of applications for the 1990 AIFRB Travel Assistance Program were received, but \$250 awards were made to four worthy Associate Member applicants who delivered papers at shellfish and food technology meetings in 1990.

The Board of Control approved a change in the name of the *AIFRB Travel Assistance Program* to the *AIFRB Associates' Research Award Program*.

No W. F. Thompson Best Paper Award was made this year, nor were Outstanding Achievement Awards for individuals or groups given.

District Reports

Northern Alaska District

District Director William Wilson delivered the following report:

Since the last Board of Control meeting in 1989 at Anchorage, the Northern Alaska District has remained fairly active in the fisheries research scene in the northern part of the state. Perhaps the largest issue in 1989 was the Prince William Sound oil spill. Our District continued to work with the Alaska Chapter of AFS to offer our members' expertise for a third-party review of the oil spill cleanup program and the monitoring study plan. Together, AIFRB and AFS made our expertise available to state and federal agencies and the oversight groups responsible for conducting the various studies. Although not contacted to do such a review, individual members of AIFRB were very much involved with the cleanup and monitoring efforts.

Again, various interests in Alaska attempted to influence passage of legislation which would allow net-pen culture of salmon in Alaska. The legislature's Finfish Farming Task Force prepared an assessment of the pros and cons of the proposed program, which was reviewed by the Northern Alaska District. Additional material was requested, but the legislature put the issue on hold, and did not pass legislation allowing finfish farming in Alaska. This is a highly charged issue, with many people on both sides of the fence. Our District will continue to monitor new developments and offer our technical expertise to the legislature if needed.

On a related issue, our District has continued to coordinate with John Karinen and the Southeast Alaska District to prepare a joint white paper on mariculture in Alaska. One

member from our District has agreed to participate in writing the paper. To date only background research and data gathering have been accomplished.

Our lunch speaker program slowed a little this year. A presentation was held this spring with Doug McBride, Alaska Dept. of Fish & Game, presenting research on damage to salmonids from electroshocking. McBride indicated research will continue, but early findings suggest that the state may, in the future, begin to discourage electroshocking for collection of some fishes. Additional speakers have been defined for another series of brown bag lunch presentations later this fall after the field season ends.

The Northern Alaska District continues to send its members a short newsletter from time to time, depending on the need and the Director's ambition. Copies of the newsletter are shared with the Southeast Alaska and the Northwest Washington Districts. Contents vary, from announcements of meetings to national AIFRB news. This past winter our District made available to members and various state and federal research groups information on the AIFRB Travel Assistance Program.

This past winter our District joined with the Southeast Alaska District to lend support for the U.S. Forest Service fisheries budget for Fiscal Year 1991. Letters were sent to our congressional delegation and to key Senate and House Appropriations Committee members and to the House Subcommittee for Interior and Related Agencies stressing the need for (a) the Anadromous Fish Habitat Project in Juneau, and (b) federal funds for a new cooperative USFS/University of Alaska laboratory facility in Juneau.

Thanks to AIFRB nationally, the Northern Alaska District has been assisted in continuing our work. Funds made available have been used for various public service and membership information transfer, particularly for postage for various mailings. Our District's treasury is in good shape right now, but we likely will ask for dues contributions from our members next year.

A District Nominating Committee has been formed, and a roster of members was provided to them recently. The committee will develop a slate of candidates for new officers of the District for a vote by the membership this fall. I will be completing my office as Director after the Board of Control meeting in Pittsburgh later this month.

Finally, I note that AIFRB is a great organization and it has been rewarding to me to be a part of AIFRB activities in Alaska. However, I often felt I was a one-man show, with little interest shown by many biologists in Alaska. There is a small core group of "faithful" in the Anchorage area, and there is much going on in Alaska. However, AFS seems to fit the needs of many fishery scientists in Alaska. We need, perhaps, to reevaluate the role of AIFRB in Alaska, at least in the northern part of the state. I look forward to continuing to participate in our District's activities.

Southeast Alaska District

District Director Karinen furnished the following report:

The Southeast Alaska District has been relatively inactive this past winter and summer as far as formal meetings, seminars, and social gatherings initiated by the District are

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District Reports cont.

concerned. Although few joint activities were taken by District members, several members acted individually on various issues. A number were involved in activities and projects relating to the Exxon Valdez oil spill; several members were involved in meetings, exchange of scientific information, and review of genetic issues relating to the Finfish Farming Task Force assessment of net-pen culture of salmon. Members from the Northern and Southeast Districts are coordinating on a joint effort to prepare a white paper on mariculture in Alaska. Dr. K Koski played a major role in providing information to Congress regarding the logging issues in Southeast; and several members provided information relating to genetic and disease issues relative to salmon culture and management in Southeast Alaska.

The District joined with the Northern Alaska District to provide support for the U.S. Forest Service fisheries science budget for Fiscal Year 1991. Letters were sent to our congressional delegation and to key Senate and House Appropriations Committee members and to the House Subcommittee for Interior and Related Agencies stressing the need for (a) the Anadromous Fish Habitat Project in Juneau and (b) federal funds for a new cooperative USFS/University of Alaska laboratory facility in Juneau. Acknowledgement and thanks for our letters were received.

Joint efforts by the University of Alaska, the Auke Bay Laboratory, the Alaska Department of Fish and Game, and other federal and state agencies within Southeast Alaska provide a stimulating fisheries science atmosphere throughout the year, with weekly or biweekly seminars on the UAS campus adjacent to the Auke Bay Laboratory. Most of the important issues relating to fish research and management have been touched upon in stimulating seminars by local and visiting scientists during the past year. Most of the same issues which I mentioned two years ago are still with us, with some gaining even greater importance. Genetic issues relating to maintaining the diversity of salmonid populations, stocks, and races seem to be key to several activities—hatchery enhancement, salmonid management, salmon ranching, and increasing recreational fishing pressure.

Recreational fishing for salmon and halibut has increased tremendously in both Southcentral and Southeast Alaska in the last two years. A booming charter business has developed in the Auke Bay/Juneau area, having more than tripled since last year. Auke Bay alone now supports a charter fleet of about 15 vessels which make 3-4 trips daily. King salmon and halibut are the species receiving greatest pressure from the charter and other recreational fishing because they are available for the longest period in local waters. The Alaska Department of Fish and Game has had a king salmon enhancement program in operation for the last three years, utilizing king salmon fingerlings reared at the Snettisham Hatchery and releasing them in the Juneau/Auke Bay area to alleviate pressure on wild stocks from the Taku River. This program has realized some significant success, but with one caveat—the stock of kings used develops spawning characters very rapidly upon entering Southeast waters and many of the fish are very dark by the time they reach local waters. This has made them less desirable and available to local

recreational fishermen, although they have contributed significantly to commercial fisheries westward.

King salmon stocks in Southeast Alaska will undoubtedly have increased pressure from both harvest and environmental habitat degradation over the next few years. Many wild stocks of king salmon in southern Alaska, British Columbia, and the Yukon Territory are threatened by either logging, mining, overharvest, or stock integrity pressures. Recently, an adult Atlantic salmon was captured in Southeast Alaska, bringing home to us the dangers of escaped salmon and straying from salmon ranching, perhaps from as far as Puget Sound.

The financial status of the Southeast Alaska District is similar to that of past years. We have a small balance, perhaps enough to take care of communication expenses for the next year. A small dues contribution from members will be required this coming year to keep our budget in the black and provide some support for travel to meetings. We appreciate the assistance given by the national treasury for attendance at the last two Board of Control Meetings.

Currently we are losing ground in the membership arena. Each year we lost 3-4 members through retirement, lack of interest, non-payment of dues, or other causes. These people are not being replaced by newly recruited members.

A District Nominating Committee has selected four candidates for election to District Director and Director-Elect. An election will be held this fall, and I will complete my office as Director at that time.

I have found my time in this office to be challenging, yet enjoyable. I particularly remember the fine people I have met and worked with at the Board of Control meetings. It has been a privilege and honor which I will not forget. I look forward to continuing to work with the outstanding members of this District and hope that by combining our resolve and wisdom we can chart a course for AIFRB in Alaska which will carry on in the direction envisioned by its founders.

Northern California District

District Director Ueber described the activities of his District in 1989-1990. The major thrust was toward building membership, and two new members were recruited. Most recent recruits have come from consultant organizations. District lectures and other programs have been popular among fishery people, but have not drawn many new members. The membership of this District consists of 40% California Fish and Game employees, 40% National Marine Fisheries Service employees, and 20% others.

Carolina District

Although not able to be present, District Director John Dean furnished the following report:

The Carolina District sponsored a program on "Fishery Habitat Research Issues" in Charleston in December 1989. The meeting was held in the evening during a meeting of the South Atlantic Fishery Management Council. Since several AIFRB members are either members of the Council or are from a federal or state agency or from a university that regularly supplies information to the Council, it was an excellent opportunity to gather. In addition, Council members and visitors to the Council proceedings were invited to the

presentation by Dr. David Peters of the NMFS/SEFC laboratory at Beaufort, NC. It was clear that many of the programs that Dave discussed directly addressed habitat issues that the Gulf and South Atlantic Fishery Management Councils regularly deal with.

The format of holding an AIFRB meeting in conjunction with a management council session was cost-effective and made some Council members aware of our professional fisheries scientist organization. Several AIFRB members proposed that we consider scheduling a similar session in the future; other Districts might want to consider doing the same, and coordinate such a session with other Districts.

John Merriner reported on recent activities in the Carolina District. Leaders have been active in trying to secure new members, and have concluded that the District should expand its interests in order to increase the membership. District Director Dean hopes to have two to four meetings per year.

New York-New Jersey District

District Director Rachlin stated that this District is almost inactive, with poor response to correspondence and poor attendance at meetings. Despite this, membership rises—there were two new members enrolled this year, possibly as a result of the Travel Assistance Program.

Texas District

District Director Ray describes the District as being in the condition as a year ago, with no new members. The District is attempting to organize a symposium on shrimp by-pass.

New Business

It was moved and seconded to change the AIFRB by-laws requirements for a quorum at Board of Control meetings; a quorum would consist of at least four District Directors and one elected officer. The motion passed.

It was moved and seconded that, in the absence of the President at a Board of Control meeting, the meeting would be chaired by the immediate Past-President, and, in his absence, by the President-Elect. The motion passed.

Alaska Sea Grant has prepared a white paper on fish genetics. The question was raised as to whether AIFRB should reprint this white paper. Jack Helle will consult with Sea Grant to learn their feelings concerning such an action.

1991 Meeting

The 1991 meeting of the AIFRB Board of Control will be held on September 6-7 at the San Antonio Marriott Riverwalk, San Antonio, Texas.

Change of Presidency

The chair was assumed by the new President, Jack Helle, at 12:06 p.m. on August 26, 1990. President Helle adjourned the meeting.

AIFRB Financial Report

Treasurer Joseph Rachlin reported on the state of AIFRB's finances at the Board of Control meeting at Pittsburgh, Pennsylvania on August 25, 1990. A summary of his report is presented here.

AIFRB Treasurer's Report, Fiscal 1990 as of 6 August 1990

CREDITS:

Dues Receipts	\$17,517.70
Balance Carryover From Fiscal 1989	10,509.27
Rental of Mailing List	125.00
Total Credits	\$28,151.97

DEBITS:

Treasurer's Expense:

Assistant	\$ 1,134.00
Insurance Bond	100.00
Computer Supplies, Mailing Labels	115.54
Treasurer's Stationery Stock	190.60
Dues Notice Postage	272.85
Bank Charges-Canadian Exchange Costs	20.00
Subtotal	\$ 1,832.99

BRIEFS:

Production and Postage	\$ 1,750.00
Coastal Press, Printing	3,269.30
Editor's Costs	25.46
Subtotal	\$ 5,044.76

Awards:

Associate Member Travel Award Program	\$ 1,000.00
W. F. Thompson Award:	
No Award This Year	000.00
Subtotal	\$ 1,000.00

Other:

AFS 1989 Meeting Contribution	\$ 300.00
Travel to 1989 AIFRB Board Meeting	3,200.00
Travel Adv. to 1990 AIFRB Board Meeting	1,400.00
District Expense Reimbursement	468.70
Election Costs Reimbursement to Secretary	248.14
Membership Chair Assistant	2,000.00
Membership Chair Costs Reimbursement	393.55
Subtotal	\$ 8,010.39
Total Debits	\$15,888.14

ASSETS:

I-Liquid:

Prudential-Bache Money Market	\$ 4,320.00
Prudential-Bache Cash Account	179.90
Checkbook Balance	12,263.83

II-Asset Funds:

Blackstone Income Trust Inc. 360.00 sh.	\$ 2,970.00
*P-B. Municipal Ser Fnd NJ 1,211.003 sh.	12,727.64
P-B. Equity Fund 631.928 sh.	7,349.32
*Franklin Tax Free Trust NJ 451 sh.	4,866.29
*Van Kampen Merritt 695 sh.	6,956.95

*Result of Sale of P-B Govt. Sec. Int. Trust	02 Oct '89
*Result of Sale of P-B Utility Fund	18 Sep '89
*Result of Sale of CD Gibraltar Sav FSLIC	19 Oct '89
Total All Assets	\$51,633.93

Let's Find These Members

The AIFRB Treasurer is anxious to locate the following members so his records can be brought up to date:

Jack E. Bailey, formerly of Juneau, Alaska
Gene Deschamps, formerly of Olympia, Washington
Dr. J. Garrey Maxwell, formerly of North Sydney, Australia
A. L. McLain, formerly of Homosassa, Florida
Robert F. Sewak, formerly of Grand Prairie, Texas
William L. Sheridan, formerly of Seattle, Washington
Jeffery W. Tupen, formerly of Edmonds, Washington

Anyone who knows the present address of any of these members would do a service for AIFRB by notifying Dr. Joseph Rachlin, Department of Biological Sciences, Lehman College, Bedford Park Boulevard West, Bronx, NY 10468-1589.

Pay Dues

The Board of Control emphasizes the importance of payment of dues and the urgency of paying promptly. Payment at the right time eases the burden of the AIFRB Treasurer and relieves members of the problem of delinquency and the possibility of adverse action.

Membership Report

NEW ASSOCIATES

William E. Ensign
James Masuoka

VA
CA

Sammy M. Ray, *Membership Chairman*
Texas A&M University at Galveston
Building 3311, Fort Crockett
Galveston, Texas 77551

Direct membership inquiries to the Membership Chairman

BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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*American Institute of Fishery
Research Biologists*

NMFS Laboratory • Beaufort, NC 28516



FIRST CLASS

Comments on President's Report

Past-President Bernard Skud offers the following comments concerning the President's Report that appeared in the last issue of BRIEFS:

My comments are on the part of President Cole's Report (BRIEFS, Vol. 19, No. 5) that concern the "recurring problems" of AIFRB. As stated, his list is not new and the problems have been discussed at recent meetings of the Board of Control. Indeed, they have been "issues" for much of AIFRB's history. I applaud Pete Cole's discussion of these problems—for they should be aired with the membership. However, I don't share his pessimism or conclusions, which I assume are open to debate.

AIFRB's "identity crisis" is not, in my opinion, solely tied to AFS, but, in some respects, the two organizations have more in common now than they did years ago. Since AFS has adopted several activities that were initiated by AIFRB (such as professional recognition, geographic entities, and student travel awards), perhaps there is less justification for separate organizations than in the past. But as Pete pointed out, AIFRB still has the distinction of recognizing career-long professional achievement. Other offerings by AIFRB include the newsletter, occasional publications, special awards, and, in some areas, District meetings. The Founders never intended to offer more (no journal or national scientific meetings) and although it may not be enough for many, it is apparently acceptable to the core 1,200 in the organization. In this regard, it is well to note that the number of Certified Fisheries Scientists (CFS) in AFS is about the same, but represents less than 15% of the total (8,600) AFS membership—this too is an "elitist group"!! (These figures and the following data are approximations from the latest directories of the two organizations.)

The West Coast (Alaska, California, Oregon, and Washington) accounts for about 40% of the AIFRB membership, and accounts for 25% of the AFS membership and 20% of the CFS's. The number of CFS's from the West Coast is about half of that area's membership in AIFRB. The area has a disproportionately large membership in both organizations. The fact that our strongest support is from this area has little to do with the success or failure of AIFRB as a National Organization, and judging from the list of charter members as well as statements by Founders such as W. F. Thompson and Heward Bell, it is clear that AIFRB was not

conceived as a West Coast organization. For these reasons, I disagree with Pete's notion that we should concentrate our efforts on the West Coast and abandon his "national outreach program"; instead we have to work harder at achieving such a goal. Besides, pushing the West Coast would, I think, send the wrong message to the rest of the membership.

Whereas AIFRB has problems attracting members in certain areas, AFS is suffering from over-expansion. AFS President Larry A. Nielsen (an AIFRB member) recently reported that "... we have outgrown our budget, our staff, our volunteer's patience, and perhaps our fundamental missions. . .". Pete also mentioned the problems in some of the AFS Chapters, i.e. only 50% of the members belong to the parent organization which is perhaps symptomatic of the problems in AIFRB. I am a member of both organizations and am not that discouraged about finding solutions to problems that are similar to those most organizations experience in the course of their history. Nor do I consider AIFRB's financial condition to be so weak relative to our activities. We spent less last year than we earned, and through prudent investment for many years have accumulated a \$50,000 reserve. As I understand, we are close to exceeding the reserve allowable in our particular tax status. Perhaps some of the reserve could be spent to advertise AIFRB.

While I agree that there are questions about the future of AIFRB—we ought not judge the situation solely on the basis of Pete's evaluation. I don't think that many members joined AIFRB because they disagreed with AFS policies, nor do I feel the "uneasy tension" between the organizations. I think we should keep all options open, including the possibility of joining AFS in one capacity or another. Pete was concerned about the members-at-large—those without the opportunity to attend District meetings. I think this is a misconception—a non-problem. I wager that less than 5% of the membership attend such meetings. Even in the Northwest which holds meetings regularly in Seattle, only a fraction of the local membership attends. In essence, most members are "at-large" and I see no reason to apologize for this or our main purpose: professional recognition. (The CFS's in AFS have no arrangements for meetings, either.)

I join Pete in wishing President Helle good luck and hope Jack will re-institute programs that have been neglected in the last two years. I also want to acknowledge the load carried by Secretary Roy Nakatani, Treasurer Joe Rachlin, Member-

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Comments cont.

ship Chairman Sammy Ray, BRIEFS Editor Oliver Cope, Production Editor John Merriner, and several of the District Directors during this period.

*Bernard E. Skud, Past-President (1982-1984)
Vancouver, British Columbia*

AIFRB Fishery Biologist Honored

The following is from an article that recently appeared in the *Juneau Empire* describing an honor received in the name of Dick Marriott, whose obituary appeared in the October 1989 issue of BRIEFS:

In a pond above the Switzer Creek meadow, a school of spawning pink salmon circle the waters; a hump occasionally breaks the surface while the fish search for a place to deposit their eggs.

Nearby, the intermittent soliloquy of a chainsaw occasionally breaks up the salmon's mating ritual.

Planks are being sawed and placed across the muddy ground here, the last links in a trail that will honor a man who spent much of his life teaching Juneau youth the values of the pond, the salmon who rear in it, and the tiny stream that gives it life.

The trail and pond are being named after Dick Marriott, a retired sports fishing biologist who died of bone marrow cancer in 1989. For years, Marriott brought youth to Switzer Creek as part of Sea Week, which is a week-long effort to teach students about fisheries and habitat. It was one of the duties he undertook as the region's sports fishing biologist, but it came naturally to him.

"He was always interested in children," said Bob Armstrong, a friend of Marriott, "and loved helping children understand fish resources better. He didn't hesitate to go into classes to talk to youngsters."

Marriott, said fellow biologist Mark Schwan, was always getting letters from children thanking him for their expeditions to the tiny creek.

Marriott's dedication to the creek and children is something people do not want to forget. The trail is a joint effort by the Taku Conservation Society, the Juneau City-Borough Parks and Recreation Department and the Department of Fish and Game, Sport Fish Division, to remind people of Marriott's work.

Judy Cooper, Parks and Recreation project supervisor, is overseeing the trail's completion. Parts of the ¾-mile trail were completed several years ago, but the finishing touches had to wait until this year.

On a wet day recently, Cooper and Nancy Ratner of Fish and Game walked the trail, trying to find where several unmarked and unimproved paths lead farther up.

The trail consists of several sections of 14-inch-wide boardwalk over wetter areas. In dryer places, the path is on the ground. The new boards' cleanlines contrasts with the dull gray of older wood.

The trail will be an important tool in teaching children about salmon streams, said Ratner. Salmon habitat does not

consist only of the water, Ratner said, but also of the surrounding area. The trail is going to be part of the department's Aquatic Trails System, a program that teaches students about watersheds and the value of streams.

From the trail, Cooper said, walkers can see a variety of habitat. Second-growth forest covers part of the trail, the result of a clear-cut area years ago. Farther along an unimproved path, the canopy opens up where the path enters a stand of old-growth forest.

On one section, bear scat sits in the middle of the path. In the mud along the pool, Cooper spots blue heron tracks.

Despite the proximity to neighborhoods and industry, Switzer Creek has been able to cope with the growth of the area.

"The picture you ought to paint is the creek's beautiful," said area habitat biologist Janet Schempf. "It's got a lot of habitat value."

Switzer still provides important habitat for pink, coho, and chum salmon and also Dolly Varden, said Schwan. Bears feed along its banks and a variety of plants and other animals are nourished in its path.

Marriott's wife, Betty, said her husband would be honored to have the trail and pond named after him. She teaches at Gastineau Elementary school.

"I just think its great," she said. "What a marvelous memorial to give a man who truly loved his job and gave it everything he had to do it well."

The Marriotts came to Alaska from Washington in 1962 to work in the Kodiak area. They moved to Juneau and in 1969 he became the region's sport fish area management biologist.

Marriott and Armstrong were also responsible for pioneering several cross country skiing routes in the area. A memorial ski tour is sponsored each winter on one of the routes.

"He always had a good outlook," Armstrong said. "People just enjoyed being with him and working with him."

IRS Status of AIFRB

AIFRB is currently classified by the Internal Revenue Service as C-6. AIFRB's C-6 status limits its gross annual income to \$25,000 without tax consequences. If AIFRB wishes to change to C-3 status, which would exempt us from all state tax, among other advantages, AIFRB must demonstrate "benefits" to everyone or "benefits" for education purposes. The President reminds us that changing any Articles of Incorporation of AIFRB requires considerable work and refers to Article VI on the steps necessary for Amendment of Articles."

Our People

Leonard "Bull" Durham (Emeritus 1990) has retired from his fishery biologist position at Eastern Illinois University.

Paul Shafland (Member 1982), president of the American Fisheries Society Introduced Fish Section, is director of the Florida Non-native Fish Research Laboratory at Boca Raton. This laboratory is the only state-supported exotic species laboratory in the United States.

Gary Matlock (Member 1989) has been honored by the Texas Chapter of the American Fisheries Society for outstanding work as a fisheries administrator in his position as Fisheries Division director in the Texas Parks and Wildlife Department at Austin. Under Gary's direction, the department established the Lone Star Lunker Program, increased protection of sportfishing through length limit management, added problem fish to the harmful fish list, established the paddlefish, striped bass, snook, tarpon, and Guadalupe bass restoration program, increased hatchery production, developed management plans for shrimp and oysters, developed genetic marking programs designed to evaluate stocking success, and restored and expanded the A. E. Wood State Fish Hatchery.

Two AIFRB people were installed as officers in the American Fisheries Society at the Society's annual business meeting in Pittsburgh, Pennsylvania on August 28. **Larry Nielsen** (AIFRB Member 1982) became *President* of AFS, and **Carlos Fetterolf** (AIFRB Fellow 1973) began his term as *First Vice-President*.

In Memoriam

Clifford W. Long

AIFRB Associate Member 1986

May 1, 1990

District News

NORTHERN CALIFORNIA

Edward Ueber, Director

In November the Northern California District of AIFRB completed a 1-year lecture series on the flora, fauna, and waters in the Gulf of the Farallones. The November lecture completed a total of four lectures. Our first lecture was given by Dr. David Petterson of U.S. Geological Survey on what is known of the coastal currents which occur in this area. Dr. David Ainley of Point Reyes Bird Observatory presented the second lecture on the birds and marine mammals found in the area. The third lecture was by Dr. Marlene Noble of U.S. Geological Survey and covered what is known of the oceanic currents offshore, the sediment type, and sediment movement in the Gulf. The final lecture was a panel discussion on what we know about the ocean environment and how it might be effected by ocean dumping of dredge spoil. This panel consisted of personnel from EPA, Port of Oakland, COE, and NMFS.

These lectures have been well attended, averaging 36 people per meeting, and have occurred in San Rafael, Alameda, and San Jose, California. A fifth lecture was canceled because it was scheduled during the 1989 Bay Bridge World Series and fell shortly after the earthquake in October of 1989.

Interest in the Gulf of the Farallones has increased over the last 3 years since it became a National Marine Sanctuary

(approximately 1,000 square miles). It is also the only oceanic sanctuary within a Biosphere Reserve of the United Nation's, "Programme on Man and the Biosphere". The Gulf is roughly 1,500 square miles and contains the most heavily trawled area on the west coast of the United States (CA, OR, and WA). The Gulf also supports the largest seabird rookery and diverse marine mammal breeding area on this coast. Technical information presented at these lectures assisted in the education process of different agency personnel in the San Francisco area. This environmental, oceanic approach to learning of the intricacies of the Gulf has also helped to develop a successful joint research project among the U.S. Geological Survey, the National Marine Sanctuary, the United States Navy, and the Environmental Protection Agency. A concerted and coordinated effort is currently underway to obtain information on some of the aspects of the Gulf which have not been studied.

1991 will usher in a new series of lectures which will focus on technological changes which effect fisheries and fishery research. These lectures will look at new statistical methods, research apparatus, fishing equipment, and other changes brought about by technology. The Northern California District will continue to rotate the meeting places among the North Bay, South Bay, East Bay, and San Francisco. We expect the active participation of the past to continue at our future lectures, banquets, and business meetings, and invite all to come and bring a friend or a fishery biologist.

NORTHWEST WASHINGTON

Donald McCaughran, Director

On October 25, the first program of the Fall season featured a recently described new species, the spotted salmon (*Oncorhynchus pinto*). Merritt Tuttle, Chief of the Environmental and Technical Services Division of NMFS in Portland, said that now that the spotted owl has been thoroughly roasted, attention is turning to several wild stocks of Columbia and Snake River salmon which are substantially threatened by habitat loss, overfishing, industrialization, and dilution by hatchery fish.

Last summer the Shoshone-Bannock Indian Tribe, Oregon Trout, AFS, and several environmental groups filed petitions with NMFS requesting that select stocks of salmon be added to the Endangered Species Act list. The battle to "save the spotted salmon" is just beginning to heat up. Proponents such as Andy Kerr, Oregon Natural Resources Council, point out that "Too much water is taken from streams for irrigation. Too much hydroelectric power is being produced. Too much logging, grazing, and mining are destroying spawning habitat."

On the other hand, groups such as BPA and the aluminum industry claim that scientists "have an incomplete and distorted sample of the wild chinook runs" and that listing of salmon stocks will have a drastic effect on power production and on the industries that depend on that power, perhaps on the scale of WPPSS.

cont. on page 4

District News cont.

Merritt Tuttle set the stage for the upcoming battle, providing an overview of the status of Columbia and Snake River stocks and describing the steps that must be taken before a salmon stock can be eligible for an Endangered Species Act listing.

The second program for the season was held on November 15, when Ian Todd, Executive Secretary of the Pacific Salmon Commission, provided an evaluation of the current U.S./Canada Salmon Treaty.

Meeting Announcements and New Publications

North Central Aquaculture Conference

North Central Aquaculture Conference will be held on March 18-21, 1991 in Kalamazoo, Michigan. Sponsored by the North Central Regional Aquaculture Center, the Ontario Ministry of Natural Resources, the Michigan Department of Natural Resources, the Illinois Department of Natural Resources, the U.S. Fish and Wildlife Service, and the Michigan Fish Growers Association, the conference will focus on practical fish culture of interest to both private and public organizations.

After the plenary session, workshops will be held on marketing and economics, aquaculture development, biotechnology, engineering technology, aquaculture effluents, pondwater quality, percids and esocids, striped bass, bait fish, and fish disease issues.

For more information call (616) 668-3388 in the USA or (416) 832-7161 in Canada.

Human Natural Resources Conference

A three-day leadership conference on *Human Resources/Natural Resources: Diversity for Success* organized by the Midwest Women in Natural Resources has been scheduled for April 23-25, 1991, at Stevens Point, Wisconsin. The conference will explore the challenges and opportunities brought about by cultural diversity in the traditional resources and environmental protection professions.

While "diversity" has proven itself to be the buzz word of the environmental community, cultural diversity has become an issue in the work environment of natural resources and environmental protection professions. U.S. Bureau of Labor Statistics indicate that by the turn of the century, 47 percent of the nation's workforce will be women, and 26 percent will be Asian, Latino, or African American. Acceptance of cultural diversity in the traditional workplace, as well as expanding on the opportunities diversity offers, is a challenge of this new decade.

The conference, *Human Resources/Natural Resources: Diversity for Success*, will have particular relevance to natural resource and environmental protection administrators, professionals, and future leaders of the upper midwest. The conference will address not only workforce diversity at the organizational level, but the need for organizations them-

selves to adapt, reflect, and capitalize on the experience, values, and principles of the population as a whole.

Nationally prominent speakers and consultants will address multicultural and environmental ethics and values, leadership and administration issues, tools for dealing with entrenched systems, and career and family balance.

Conference co-sponsors are Iowa Women in Natural Resources; Michigan Department of Natural Resources; Midwest Women in Natural Resources; Minnesota Forestry Association; USDA Forest Service; University of Minnesota, College of Natural Resources; University of Wisconsin - Madison, Institute for Environmental Studies; University of Wisconsin - Stevens Point, College of Natural Resources; University of Wisconsin - Stevens Point, Continuing Education and Outreach; and the Wisconsin Department of Natural Resources.

For information on the conference, contact Dana Nelson, University of Wisconsin, Continuing Education and Outreach, Stevens Point, WI 54481-3897; 715/346-3717.

Writing for Fishery Journals

Writing for Fishery Journals, edited by John R. Hunter (AIFRB past-president), is a product of the AIFRB symposium held in 1988 at Toronto, Canada. This book of 100 pages in softcover is a joint effort of the American Fisheries Society and AIFRB, and can be purchased from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199. The price is \$12 for AIFRB and AFS members and \$15 for others, with a \$3 postage charge for shipments outside of the USA.

Writing for Fishery Journals addresses ways that fisheries biologists and managers can communicate more effectively and improve the chances of getting their work published. The book conveys practical advice to authors from the perspective of editors who decide the fate of manuscripts.

Read what several prominent editors and communicators have to say about gray literature, displaying data in graphs and tables, style, following instructions to authors, and more.

Writing for Fishery Journals is essential reading for students, educators, fishery biologists, editors, science writers, and anyone who must document and publish their research.

Chapters after the Foreword are: Usage and Style in Fishery Manuscripts; Problems with Gray Literature in Fishery Science; Graphic and Tabular Display of Fisheries Data; We Don't Care, Professor Einstein, the Instructions to the Authors Specifically Said Double-Spaced; Scientific Writing as English Prose; Statistical Aspects of Fisheries Papers; Statistical Problems in Fisheries; and Common Statistical Errors in Fishery Research.

Catalog of the Genera of Recent Fishes

The California Academy of Sciences has published *Catalog of the Genera of Recent Fishes*, by William N. Eschmeyer. Contents cover genera of recent fishes (with Reeve M. Bailey), genera in a classification, index to higher taxa, literature cited, glossary and abbreviations, genera of

recent fishes and the International Code of Zoological Nomenclature, and opinions and other actions of the International Commission involving fishes (with Barbara Weitbrecht and William F. Smith-Vaniz).

The 697-page book can be ordered prepaid from Scientific Publications, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118. The price is \$55.00 plus \$8.00 per copy outside of North America.

Culture and Toxicity Test Methods

The video-based training packages, developed by the Environmental Protection Agency's Office of Water Enforcement and Permits, are available for training laboratory personnel in handling, culturing, and testing methods for freshwater organisms. One is *U.S. EPA Freshwater Culturing Methods for Ceriodaphnia dubia and Fathead Minnow* (Pimephales promelas), consisting of a 24-minute video that presents guidelines for setting up and maintaining daphnid cultures for use in toxicity tests, and an 18-minute video on methods for producing healthy fathead minnow cultures. Each video has a supplemental report covering choice and preparation of culture water, feeding, culturing, and other appropriate topics. The package also includes a 249-page manual, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. The other package is *U.S. EPA Test Methods for Freshwater Effluent Tests*, covering *Ceriodaphnia* survival and reproduction toxicity tests (a 23-minute video with 26-page report), fathead minnow larval survival and growth toxicity tests (a 15-minute video with 18-page report), and the book on short-term testing methods for waters.

The first package costs \$60 and the second package costs \$45, but the price for both package is \$90. Order from National Audiovisual Center, Customer Service Staff, 8700 Edgeworth Drive, Capitol Hts., MD 20743-3701.

Annual Review of Fish Diseases

A new journal, *Annual Review of Fish Diseases*, begins in 1990. Published by Pergamon Press, Volume 1 is entitled *Fish Diseases in Aquaculture*. This is a peer-reviewed annual periodical which publishes current reviews and theoretical papers dealing with aquatic animal health. Of interest are reviews summarizing the current knowledge of infections of fish caused by viruses, bacteria, fungi, or parasites; virulence factors of fish pathogens; nonspecific factors involved in host susceptibility and resistance to infection; the epidemiology of fish diseases; basic and applied immunology of aquatic animals; the association of pollutants with disease incidence and tumor development; and the therapy and prevention of disease.

While the study of fish immunology and disease has witnessed tremendous growth, there is a need for a comprehensive publication designed to provide a definitive, critical summary of the field's burgeoning literature. *Annual Review of Fish Diseases* is designed to fulfill this need.

Annual Review of Fish Diseases will be an invaluable addition to the growing body of literature, and will be of interest to fish pathologists, fish biologists, comparative

immunologists, aquaculturists, fisheries managers, ichthyologists, and all those interested in the study of aquatic animal health and the use of fish as models to decipher basic aspects of immunology and the etiology of disease.

Each issue of *Annual Review of Fish Diseases* will publish invited and submitted, peer-reviewed articles devoted to a specific subject area, written by acknowledged authorities. Reviews and theoretical articles dealing with fish and shellfish as models for analyzing aspects of immunology, disease, aquaculture and the influence of the environment, such as temperature, seasons and toxic substances will be published. Reviews on specific diseases, as they relate to the immune system, such as tumors and potentially destructive pathogens to fish populations, i.e. viruses, bacteria, and fungi, are also within the scope of this new journal.

There will be one issue per year, at a cost of \$90. Order from Pergamon Press, Maxwell House, Fairview Park, Elmsford, NY 10523.

Biological Markers of Environmental Contamination

John F. McCarthy and Lee R. Shugart of the Oak Ridge National Laboratory have edited *Biological Markers of Environmental Contamination*, a 600-page volume published by Lewis Publishers, Inc., 2000 Corporate Blvd., NW, Boca Raton, Florida 33431.

This timely book provides a state-of-the-science review of the use of biological markers in animals and plants for evaluating the ecological and health effects of environmental contamination. Biomarkers can be used both as indicators of exposure to toxic chemicals and as predictors of the adverse consequences of such exposure. Biological markers can also be used to help assess and predict human health risks.

This new technology is currently being used by the EPA, the NOAA, the National Marine Fisheries Science, and several agencies in Canada, The Netherlands, Germany, and Scandinavia.

The book explains the concept of environmental sentinels, gives examples of field studies, and discusses the utility of biomarkers within a risk analysis paradigm. It also furnishes a good overall perspective for anyone needing to decide whether biological markers will be useful to them.

Biological Markers of Environmental Contamination will be useful to anyone who needs to know how to assess and predict environmental contamination, especially biochemists, toxicologists, limnologists, risk analysts, environmental chemists, biochemists, ecologists, histologists, immunologists, regulators, and environmental management specialists.

The book can be ordered from the publisher for \$69.95.

Genetic Guidelines for Fisheries Management

Minnesota Sea Grant is the publisher of *Genetic Guidelines for Fisheries Management*, by Anne R. Kapuscinski and Larry D. Jacobson. This book has 66 pages, seven figures, a glossary, and an index. It is a manual written for professionals, is well-organized, and is clearly written. Topics

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Meeting Announcements cont.

cover the importance of managing genetic resources, the biological principles of fish genetics, genetic tools and their application to fish populations, and genetics issues in fisheries management.

Order from Minnesota Sea Grant, 116 Classroom-Office Building, University of Minnesota, 1994 Buford Avenue, St. Paul, Minnesota 55108.

Turtles: Perspectives and Research

Marion Harless and Henry Morlock are the authors of *Turtles: Perspectives and Research*, a book of 712 pages.

This survey of all aspects of turtle biology ranges from care and management of turtles used in research to conservation requirements and techniques. The authors cover such considerations as field and lab techniques, vital functions and sensory processes, reproduction and embryology, behavioral aspects, and population ecology. Wildlife biologists, herpetologists, comparative psychologists and physiologists, turtle hobbyists, and medical and veterinary students and researchers will find this text helpful for all aspects of their work, and in the formulation of plans for future research and conservation.

This volume can be ordered from Krieger Publishing Co., Box 9542, Melbourne, FL 32902-9542 for \$82 plus \$4.

Methods for Fish Biology

Carl B. Schreck and Peter B. Moyle have edited *Methods for Fish Biology*, a book published by the American Fisheries Society. The volume is hardbound and contains approximately 650 pages.

Methods for Fish Biology is both a reference and a handbook for the study of fishes. Standard methods and their theoretical frameworks are presented for research into fish genetics, systematics, anatomy, physiology, developmental biology, toxicology, behavior, and ecology. Recent as well as long-standing techniques of proven value are covered, and readers are alerted to potentially useful methods that are still under development. Each chapter doubles as a review paper that guides interested readers more deeply into the literature on the subject.

Methods for Fish Biology is a companion volume to *Fisheries Techniques*. Like the earlier book, this one has been written principally for graduate students and upper-level undergraduates. Its value, however, extends to professional teachers, biologists, technicians, managers, and administrators—to anyone who needs an introduction to new techniques, a review of standard methods, or an evaluation of a method's validity for a particular purpose. Although it emphasizes research on individual fish, single species, and local communities, *Methods for Fish Biology* has broad relevance to problems of fishery assessment. This long-

needed publication puts fisheries research methodology into a comprehensive, easy-to-use reference for all fisheries professionals.

This book sells for \$40 to AFS members and \$50 to others. Order from American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199.

Biological Indicators of Stress in Fish

The American Fisheries Society has published AFS Symposium 8, *Biological Indicators of Stress in Fish*, edited by S. Marshall Adams (AIFRB Member 1981).

Biological indicators of stress are functional and morphological responses of fish and other organisms to short- or long-term disturbances of the animals or their environments. The responses can be measured at several levels of biological organization to assess sublethal stress on fish, to give early warning of stress, and to investigate causal relationships between stressors and their effects at various levels of biological integration. The papers in this book survey the known indicators of stress at each level of organization—from molecules and cells through whole organisms to communities and ecosystems—and review their practical uses for the diagnosis, evaluation, and prediction of stress on fish.

S. Marshall Adams introduces the general concepts that allow biological indicators to be used for evaluating the effects of stress on fish. Alan G. Heath closes the book with a summary of proven and potential indicators of stress. Eleven other papers cover molecular and biochemical indicators, physiological and behavioral indicators, immunological indicators, histopathological indicators, enzymatic indicators, bioenergetics indicators, organismic indicators, reproductive indicators, community indicators, population indicators, and ecosystem indicators. The price to AFS members is \$24, and to others, \$30. Order from American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199.

Fisheries Techniques Slide Set

A slide set to accompany *Fisheries Techniques* by Nielsen and Johnson has been developed by the Education Section of the American Fisheries Society. The set of 381 slides and a script describing each slide is available for \$125.

The slide set was developed as a service to fishery educators and managers. Nearly all major concepts and techniques discussed in *Fisheries Techniques* are included in the set. Although the collection was developed specifically for use by educators who use *Fisheries Techniques* as a text, managers, administrators, and other fisheries people are sure to find many slides that they can use in their work. At a price of less than 33¢ per slide, the *Fisheries Techniques* slide set should be part of the reference materials available in every agency, research facility, library, college, and university.

Orders for this slide collection should be sent to Dr. James Haynes, Aquatic Ecology, Biological Science, SUNY College at Brockport, Brockport, NY 14420.

Thesis and Dissertation Abstracts

Coho Salmon Predation on Juvenile Sockeye Salmon in the Chignik Lakes, Alaska

Gregory T. Ruggerone, Ph.D. 1989

Fisheries Research Institute, University of Washington

Predator-prey interactions between juvenile coho salmon and recently emerged sockeye salmon in the Chignik Lakes were examined during 15 May to 5 August, 1985-1987. Estimated daily consumption of sockeye by individual coho in Chignik Lake, based on a stomach evacuation (direct) method, increased from about 2.0 fry day⁻¹ in late May to a maximum of 3.3 fry day⁻¹ in June, then declined in July and early August (1.1 fry day⁻¹). The average daily consumption estimate for each year, based on a bioenergetic approach, was within 14% (range: 5-20%) of direct method estimates whereas bioenergetic estimates on a given day were generally within 30% of direct estimates. The similarity in average consumption rates by the two independent methods tends to validate both estimates. Few coho were captured in nearby Black Lake and consumption of juvenile sockeye per coho was low.

Estimates of sockeye fry consumed by the coho population in Chignik Lake were based on two independent estimates of juvenile coho abundance, averaging 290,000, 230,000, and 340,000 coho during 1985, 1986, and 1987, respectively. The average of estimates of sockeye fry consumed by these coho were 68 million, 24 million, and 78 million fry, or approximately 59% of the sockeye fry population during 1985, 1986, and 1987, respectively. Trends in the run size of adult coho and relative production of adult sockeye salmon returning to Chignik Lake during brood years 1971-1982 were inversely related, suggesting that predation by juvenile coho in Chignik Lake may have influenced the run size of adult sockeye. A harvest-management strategy resulting in a fixed spawning escapement rather than the current fixed harvest rate of coho, combined with the current fixed escapement strategy for sockeye, is recommended to reduce and stabilize predation by coho on juvenile sockeye salmon in Chignik Lake.

Size-based predation by coho salmon, which occurs in littoral areas, may have influenced the evolution of large sockeye size at emergence in Chignik Lake and habitat shifts that reduce the risk of predation. Emerging sockeye fry consumed by coho were significantly smaller (\bar{x} = 29.4 mm) than those captured by emerging-fry traps (\bar{x} = 30.5 mm). Emerging sockeye fry in Chignik Lake (\bar{x} = 30.5 mm) were longer than fry from 26 of 30 sockeye stocks (\bar{x} = 28.5 mm) for which data were available. During peak emergence of sockeye fry along shoreline spawning areas in early June, sockeye fry were markedly less abundant (2 fry per beach seine set) than expected (up to 135 fry per set), based on rates of emergence and predation. Few sockeye fry (< 8 fry per set) were captured in all littoral areas during June and July, 1985-1988, whereas mid-size sockeye (36-45 mm, mostly age-0 fish) were present in small numbers beginning

in late June (\bar{x} = 10 fish/set) and sockeye >45 mm (mostly age-1 and age-2 fish) were always abundant (\bar{x} = 129 fish/set). The movement of sockeye fry away from the littoral areas occupied by numerous coho salmon and the reoccupation of littoral areas by larger, non-prey sockeye suggest that Chignik sockeye fry avoid predation by moving away from areas inhabited by coho.

Although coho salmon frequently consumed sockeye salmon fry in Chignik Lake, they never consumed threespine stickleback, which were often associated with sockeye fry. Because coho salmon are visual predators and apparently avoid consuming stickleback, I conducted an experiment in three net pens in Chignik Lake to determine whether juvenile sockeye associated with threespine sticklebacks experience less predation than sockeye salmon in single-species aggregations. Significantly fewer sockeye fry were consumed by two coho in the pen containing 60 sticklebacks (\bar{x} = 2.8 fry day⁻¹) than in the 30 stickleback (4.7 fry day⁻¹, p < 0.01) and 0 stickleback (4.4 fry day⁻¹, p < 0.025) treatments. An identical experiment with yearling sockeye rather than sticklebacks did not reveal a significant effect due to the presence of yearling sockeye (p = 0.29). These results suggest that presence of threespine stickleback may reduce predation by coho on juvenile sockeye salmon.

Effects of Lake Fertilization on Growth of Juvenile Sockeye Salmon (*Oncorhynchus nerka* Walbaum) in Lake McDonald, Tongass National Forest, Alaska

Ronald P. Olson, M.S. 1989

Humboldt State University

Lake fertilization is currently viewed as an enhancement technique for increasing sockeye salmon smolt production. The purpose of this study was to measure the effect of lake fertilization on growth of juvenile sockeye in Lake McDonald, Tongass National Forest, Alaska.

The lake was fertilized to increase the phosphorus base load (mg P/m²/year) from 45% of critical loading in 1981, to 60% of critical loading in 1982 and 85% in 1983. Data on Lake McDonald sockeye life history, growth, rearing density, parasitism, food supply, and water temperature were collected for one year prior to lake fertilization (1980) and compared with data from the next two years of fertilization (1982 and 1983).

Lake McDonald adult sockeye escapements ranged from a high of 129,653 in 1981 to a low of 16,587 in 1982. Potential egg deposition, emergent fry captures, mid-lake tow-net captures, and mark-recapture estimates of smolt trap efficiency were all unreliable measures of fry rearing densities in the lake. Lake McDonald sockeye smolts were predominately age 1, and were amongst the smallest reported in the scientific literature. *Eubothrium* parasitism rates of the outmigrating smolt population ranged from 4.1% in 1982 to 22.3% in 1981. Lake temperature and thermal structure varied substantially between years. This variation undoubtedly influenced the timing of fry emergence

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Thesis cont.

and hence the duration of lake residence between the different brood year fish.

The largest age-1 smolts (58.55 mm) and the highest summer growth rates (0.110 mm/day) were recorded for fish experiencing the second year of fertilization (1983); the smallest smolts (56.10 mm) and the lowest summer growth rates (0.102 mm/day) were recorded for fish experiencing the first year of fertilization (1982). The mean standing crop of zooplankton prey species was greatest in 1983 (141,925/m²) and the lowest in 1982 (75,370/m²). No significant difference was found in the abundance of benthic macroinvertebrates between years. A positive relationship between increased nutrient loading and increased growth of juvenile sockeye was not consistently demonstrated. It is hypothesized that any effect of the fertilization was masked by the between-year differences in other variables influencing growth. Evaluation over a longer period of time would be needed to clearly determine the effects of fertilization on the growth and production of sockeye salmon.

Membership Report

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BRIEFS, the newsletter of the American Institute of Fishery Research Biologists, is published six times a year. It is intended to communicate the professional activities and accomplishments of the Institute, its Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members.

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